

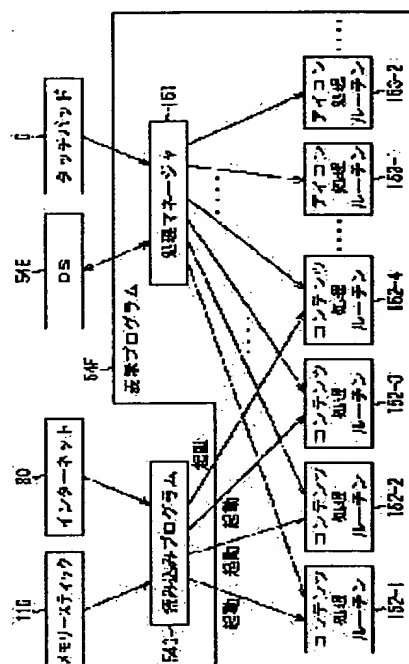
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SOLUTION: A contents-processing routine 152-1 controls the display of thumbnails. A processing manager 151 discriminates whether a thumbnail is selected. When the processing manager 151 discriminates that a thumbnail has been selected, the contents-processing routine 152-1 controls the display of a frame of the thumbnail, so as to change color with a period recognizable by the user.



[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] The information processor characterized by including the 2nd display-control means which controls the display of the frame of said thumbnail so that a color may be changed with the period which a user can recognize to be the 1st display-control means which controls the display of a thumbnail, and a judgment means to judge whether said thumbnail is chosen when judged with said thumbnail being chosen.

[Claim 2] Change of said color is lightness, saturation, or an information processor according to claim 1 characterized by including any one change of the hue.

[Claim 3] The information processing approach characterized by including the 2nd display-control step which controls the display of the frame of said thumbnail so that a color may be changed with the period which a user can recognize to be the 1st display-control step which controls the display of a thumbnail, and the judgment step which judges whether said thumbnail is chosen when judged with said thumbnail being chosen.

[Claim 4] The program storing medium by which the program which the computer characterized by to be included the 2nd display-control step which controls the display of the frame of said thumbnail so that a color may change with the period which a user can recognize to be the 1st display-control step which controls the display of a thumbnail, and the judgment step which judges whether said thumbnail is chosen when judged with said thumbnail being chosen can read is stored.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to a program storing medium at the information processor which displays a thumbnail on an information processor and an approach, and a list about a program storing medium and an approach, and a list.

[0002]

[Description of the Prior Art] In recent years, in a personal computer etc., display the thumbnail corresponding to the data of a static image or a dynamic image, a user is made to choose the data of a static image or a dynamic image by the thumbnail, and the technique of making these data operating it has come to be used.

[0003]

[Problem(s) to be Solved by the Invention] However, in selection of the thumbnail accompanying actuation of data, since the frame of a predetermined color was displayed on the surroundings of the thumbnail chosen, it is indistinguishable into the thumbnail as which many colors are displayed, and might be hard to recognize which thumbnail is chosen now.

[0004] This invention is made in view of such a situation, and it aims at enabling it to get to know which thumbnail is chosen quickly and certainly.

[0005]

[Means for Solving the Problem] An information processor according to claim 1 is characterized by including the 2nd display-control means which controls the display of the frame of a thumbnail so that a color may be changed with the period which a user can recognize to be the 1st display-control means which controls the display of a thumbnail, and a judgment means to judge whether the thumbnail is chosen or not when judged with the thumbnail being chosen.

[0006] An information processor can consider change of a color as any one change of lightness, saturation, or the hue.

[0007] The information processing approach according to claim 3 is characterized by including the 2nd display-control step which controls the display of the frame of a thumbnail so that a color may be changed with the period which a user can recognize to be the 1st display-control step which controls the display of a thumbnail, and the judgment step which judges whether the thumbnail is chosen or not when judged with the thumbnail being chosen.

[0008] The program of a program storing medium according to claim 4 is characterized by including the 2nd display-control step which controls the display of the frame of a thumbnail so that a color may be changed with the period which a user can recognize to be the 1st display-control step which controls the display of a thumbnail, and the judgment step which judges whether the thumbnail is chosen or not when judged with the thumbnail being chosen.

[0009] In an information processor according to claim 1, the information processing approach according to claim 3, and a program storing medium according to claim 4, the display of a thumbnail is controlled, and when it is judged whether the thumbnail is chosen or not and it is judged with the thumbnail being chosen, the display of the frame of a thumbnail is controlled to change a color with the period which a user can recognize.

[0010]

[Embodiment of the Invention] Drawing 1 thru/or drawing 4 are drawings showing the appearance of the gestalt of 1 operation of the personal computer of the note type concerning this invention. This personal computer 1 is fundamentally constituted by the display 3 whose closing motion is enabled to a body 2 and this body 2. Drawing 1 is the appearance perspective view showing the condition of having opened the display 3 to the body 2. It is the enlarged drawing of the jog dial 4 mentioned later with which drawing 2 is prepared in the top view of a body 2, and drawing 3 is prepared in the body 2. Moreover, drawing 4 is a side elevation of the jog dial 4 prepared body 2.

[0011] The touch putt 6 as a pointing device operated when moving the keyboard 5 operated when inputting various kinds of alphabetic characters, notations, etc., and the pointer (mouse cursor) displayed on LCD7 to a body 2, and an electric power switch 8 are formed in the top face. Moreover, the jog dial 4, the slot 9, the IEEE1394 port 101, and the memory stick slot 115 are prepared in the side face of a body 2. In addition, it is also possible to replace with the touch putt 6 and to form a stick-type pointing device.

[0012] Moreover, LCD (Liquid Crystal Display)7 which displays an image is formed in the transverse plane of a display 3. The lamp which consists of LED of message lamp ML (not shown) prepared line-indicator PL, the cell lamp BL, and if needed and others is formed in the upper right portion of a display 3. Furthermore, the microphone 66 is formed in the upper part of a display 3.

[0013] In addition, line-indicator PL, the cell lamp BL, the message lamp ML, etc. can also be prepared in the lower part of a display 3.

[0014] Next, between the key A arranged the right-hand side in drawing 2 of the keyboard 5 on a body 2, and Key B, the jog dial 4 is attached so that the top face may become the almost same height as Key A and Key B. The jog dial 4 performs predetermined processing (for example, processing of scrolling of a screen) corresponding to the rotation actuation shown in the arrow head a in drawing 3, and performs processing (for example, processing of the decision of selection of an icon) corresponding to the migration actuation shown in the said drawing Nakaya mark b.

[0015] In addition, the jog dial 4 may be arranged to the left lateral of a body 2, and may be arranged in a lengthwise direction between the left lateral of the display 3 in which LCD7 was formed, a right lateral or the G key of a keyboard 5, and the H key (namely, the jog dial 4 rotates in the direction of either the Y key or the B key like).

[0016] Moreover, operating a touchpad 6 by the index finger, the jog dial 4 may be arranged in the center section of the front face of a body 2, and may be arranged in a longitudinal direction along the upper limit edge or lower limit edge of a touchpad 6, or

may be arranged between the right carbon button of a touchpad 6, and a left carbon button in a lengthwise direction so that it may be operational with the thumb. Furthermore, the jog dial 4 may be limited to neither a lengthwise direction nor a longitudinal direction, but may attach and arrange a predetermined include angle in the direction of slant which is easy to operate it with each finger. In addition, the jog dial 4 can also be arranged in an operational location with the thumb of the side face of the mouse which is a pointing device. It is possible to use the rotation actuation mold electronic parts with a push switch for which this applicant and the common applicant applied as a jog dial and which are indicated by JP,8-203387,A.

[0017] It is equipped with the PC card whose slot 9 is an expansion card based on the specification which PCMCIA (Personal Computer Memory Card International Association) specifies.

[0018] IEEE(Institute of Electrical and Electronics Engineers) 1394 port 101 has the structure based on the specification specified to IEEE1394, and the cable based on the specification specified to IEEE1394 is connected.

[0019] The memory stick slot 115 builds in semiconductor memory, such as a flash memory, and it is equipped with the memory stick (trademark) 116 which is the memory card which memorizes data, such as a static image, a dynamic image, voice, or a text.

[0020] Next, the configuration of the gestalt of 1 operation of a personal computer 1 is explained with reference to drawing 5.

[0021] A central processing unit (CPU (Central Processing Unit)) 51 consists of Pentium (Pentium: trademark) processors for example, by Intel Corp. (Intel) etc., and is connected to the host bus 52. The bridge 53 (the so-called north bridge) is further connected to the host bus 52, and a bridge 53 has AGP (Accelerated Graphics Port)50, and is connected to the PCI (Peripheral Component Interconnect/Interface) bus 56.

[0022] The bridge 53 consists of 400BX(s) which are AGP Host Bridge Controller made from Intel, and controls transmission of data, such as CPU51 and RAM (Random-Access Memory)54 (the so-called main memory), etc. Furthermore, a bridge 53 controls transmission of data with a video controller 57 through AGP50. In addition, the so-called chip set consists of this bridge 53 and bridge (so-called south bridge (PCI-ISA Bridge)) 58.

[0023] The bridge 53 is further connected also with cache memory 55. Cache memory 55 consists of memory which can perform actuation of writing or read-out at a high speed more as compared with RAM54, such as SRAM (Static RAM), and carries out the cache of the program or data which CPU51 uses (it memorizes temporarily).

[0024] In addition, CPU51 has-like (as compared with cache memory 55, it is the memory which can operate at a high speed more, and CPU51 self controls) primary cache memory in the interior.

[0025] It consists of DRAMs (Dynamic RAM) and RAM54 memorizes data required for the program which CPU51 performs, or actuation of CPU51. Specifically, RAM54 memorizes electronic mail program 54A loaded from HDD67, auto pilot program 54B, jog dial house keeping program 54C, jog dial driver 54D, operating (program OS) 54E, display-program 54F, reading program 54G, application program 54H1 of others, or 54Hn(s), when starting is completed.

[0026] In addition, display-program 54F and reading program 54G may be made to be started when the memory stick slot 115 is equipped with a memory stick 116.

[0027] Electronic mail program 54A is a program which delivers and receives correspondence (the so-called e-mail) through communication lines, such as the telephone line 76, etc. through a modem 75. Electronic mail program 54A has the arrival-of-the-mail mail acquisition function. This arrival-of-the-mail mail acquisition function performs processing which will be acquired if it checks whether the mail addressed to a user has received a message and the mail addressed to a user is in that mail box 79 to the mail server 78 which Internet Service Provider 77 has.

[0028] Auto pilot program 54B is a program which carries out sequential starting and processes two or more processings (or program) set up beforehand in the sequence set up beforehand.

[0029] Jog dial house keeping program 54C displays on LCD7 what can be performed by operating the jog dial 4, when reception and the jog dial 4 are supported from each application program which mentioned above the notice of whether to support the jog dial 4.

[0030] Jog dial house keeping program 54C detects the event (actuation of the jog dial 4 rotating in the direction shown in the arrow head a of drawing 3, or being pressed in the direction shown in the arrow head b of drawing 3) of the jog dial 4, and performs processing corresponding to the detected event. Jog dial house keeping program 54C has the list which receives the notice from an application program. Jog dial driver 54D performs various functions corresponding to actuation of the jog dial 4.

[0031] OS(Operating System)54E is a program which is represented by the so-called MacOS (trademark) of so-called Windows (Windows) 95 (trademark) of Microsoft Corp., Windows 98 (trademark), or Apple Computer, Inc. etc. and which controls fundamental actuation of a computer.

[0032] Display-program 54F display on LCD7 the thumbnail corresponding to the file (file which stores data (it is also hereafter called contents), such as a dynamic image, a static image, voice, or a text) memorized by MEMORISUTEIKU 116 with which the MEMORISUTEIKU slot 115 is equipped. Display-program 54F operate the file memorized by MEMORISUTEIKU 116 based on the thumbnail displayed on LCD7 (a copy, migration, elimination, etc.).

[0033] Reading program 67G read the file memorized by MEMORISUTEIKU with which the MEMORISUTEIKU slot 115 is equipped, and supply the data stored in the file which read to display-program 54F.

[0034] The video controller 57 is connected to the bridge 53 through AGP50, and the data which received the data (an image data or text data) supplied from CPU51 through AGP50 and a bridge 53, and generated the image data corresponding to the received data, or were received are memorized as it is to the video memory to build in. A video controller 57 displays on LCD7 of a display 3 the image corresponding to the image data memorized by video memory.

[0035] The sound controller 64 is connected to PCI bus 56. The sound controller 64 incorporates the signal corresponding to voice from a microphone 66, generates the data corresponding to voice, and outputs them to RAM54. Or the sound controller 64 drives a loudspeaker 65 and makes voice output to a loudspeaker 65.

[0036] Moreover, the modem 75 is connected to PCI bus 56. A modem 75 receives predetermined data from a communication network 80 or a mail server 78 while transmitting predetermined data to a communication network 80 or mail servers 78, such as the Internet, through a dial-up line 76 and Internet Service Provider 77.

[0037] It connects with PCI bus 56, and the PC card interface 111 outputs the data supplied from CPU51 to an interface card 112 while supplying the data supplied from the interface card 112 with which the slot 9 was equipped to CPU51 or RAM54. The drive 113 is connected to PCI bus 56 through the PC card interface 111 and the interface card 112.

[0038] Drive 113 reads the magnetic disk 121 with which it is equipped, an optical disk 122, a magneto-optic disk 123, or the data currently recorded on semiconductor memory 124, and supplies the read data to RAM54 through the PC card interface 111, an interface card 112, and PCI bus 56.

[0039] It connects with PCI bus 56, and the memory stick interface 114 outputs the data supplied from CPU51 to a memory stick

116 while supplying the data supplied from the memory stick 116 with which the memory stick slot 115 was equipped to CPU51 or RAM54.

[0040] Moreover, the bridge 58 (the so-called south bridge) is also connected to PCI bus 56. The bridge 58 consists of PIIX4E made from Intel etc., and contains an IDE (Integrated Drive Electronics) controller / configuration register 59, the timer circuit 60, IDE interface 61, and the USB interface 68 grade. A bridge 58 controls various kinds of I/O (Input/Output), such as control of the device connected through the device connected to the IDE bus 62, the ISA/EIO (Industry Standard Architecture/Extended Input Output) bus 63, or the I/O interface 69.

[0041] The IDE controller / configuration register 59 consists of two so-called IDE controllers of a primary IDE controller and a secondary IDE controller, a configuration register (configuration register), etc. (neither is illustrated).

[0042] HDD67 is connected to the primary IDE controller through the IDE bus 62. Moreover, when other IDE buses are equipped with the so-called IDE devices, such as a CD-ROM drive which is not illustrated or HDD, the IDE device with which it was equipped is electrically connected to a secondary IDE controller.

[0043] In addition, HDD67 records display-program 67F, reading program 67G, two or more application program 67H1 of others, or 67Hn(s) as electronic mail program 67A, auto pilot program 67B, jog dial house keeping program 67C, jog dial driver 67D, OS67E, and an application program. Electronic mail program 67A currently recorded on HDD67, auto pilot program 67B, jog dial house keeping program 67C, jog dial driver 67D, OS67E, display-program 67F, reading program 67G and application program 67H1 thru/or 67Hn(s), etc. are the processes of starting (boot rise) processing for example, and sequential supply is carried out and they are loaded to RAM54.

[0044] The USB interface 68 receives data from a device while transmitting data to the device connected through the USB port 107.

[0045] A timer circuit 60 supplies the data in which current time is shown to CPU51 through PCI bus 56 corresponding to the demand of display-program 67F. Display-program 67F are made [getting to know elapsed time etc. or] based on the data in which the current time supplied from the timer circuit 60 is shown.

[0046] The I/O interface 69 is further connected to the ISA/EIO bus 63. This I/O interface 69 consists of en BEDITTO controllers, and ROM70, RAM71, and CPU72 are mutually connected in that interior.

[0047] ROM70 has memorized beforehand IEEE1394 interface program 70A, LED control program 70B, touchpad input supervisor 70C, key input supervisor 70D, and Wake rise program 70E and jog dial house keeping program 70F grade.

[0048] IEEE1394 interface program 70A receives while transmitting the data (data stored in the packet) based on the specification specified by IEEE1394 through the IEEE1394 port 101. LED control program 70B controls lighting of the message lamp ML or the lamp which consists of other LED line-indicator PL, the cell lamp BL, and if needed. Touchpad input supervisor 70C is a program which supervises the input from the touchpad 6 corresponding to actuation of a user.

[0049] Key input supervisor 70D is a program which supervises the input from a keyboard 5 or other key switches. Wake rise program 70E is a program which manages the power source of each chip which constitutes a personal computer 1, in order to start predetermined processing (or program) etc., when it checks for the time of day set up beforehand based on the data in which the current time supplied from the timer circuit 60 of a bridge 58 is shown and the set-up time of day comes it. Jog dial house keeping program 70F are a program for always supervising whether whether the rotation mold encoder of the jog dial 4 having rotated and the jog dial 4 were pushed.

[0050] BIOS(Basic Input/Output System (basic input/output system))70G are further written in ROM70. BIOS70G control delivery (I/O) of data between OS or an application program, and a peripheral device (a touchpad 6, a keyboard 5, or HDD67 grade).

[0051] RAM71 has each register for LED control, a touchpad input status, the key input status, or setting time of day, the I/O register for jog dial house keeping, or the IEEE1394I/F register as register 71A thru/or 71F. For example, when the jog dial 4 is pushed and electronic mail program 54A is started, as for an LED control register, lighting of the message lamp ML is controlled corresponding to the value in which the predetermined value is stored and stored. As for a key input status register, press of the jog dial 4 stores a predetermined actuation key flag. Predetermined time of day is set up corresponding to actuation of the keyboard 5 according [a setting time-of-day register] to a user etc.

[0052] moreover, the jog dial 4, a touchpad 6, a keyboard 5, and IEEE1394 port 101 grade connect this I/O interface 69 through the connector which omitted illustration — having — the jog dial 4, a touchpad 6, or a keyboard 5 — it is alike, respectively and the signal corresponding to actuation of receiving is outputted to the ISA/EIO bus 63. Moreover, the I/O interface 69 controls transmission and reception of data with the device connected through the IEEE1394 port 101. Furthermore, line-indicator PL, the cell lamp BL, the message lamp ML, the power control circuit 73, and the lamp that consists of other LED are connected to the I/O interface 69.

[0053] The power control circuit 73 performs control for charge of the second battery of the built-in dc-battery 74 or a peripheral device while it connects with the built-in dc-battery 74 or the AC power and it supplies a power source required for each block. Moreover, the I/O interface 69 is supervising the electric power switch 8 operated when a power source is turned on or turned off.

[0054] The I/O interface 69 performs IEEE1394 interface program 70A thru/or jog dial house keeping program 70F also in the condition that a power source is off, according to the power source prepared in the interior. That is, IEEE1394 interface program 70A thru/or jog dial house keeping program 70F are always operating.

[0055] Therefore, an electric power switch 8 is off, and even when CPU51 is not performing OS54E, since the I/O interface 69 performs jog dial house keeping program 70F, when it is in a power-saving condition or the condition of power-source OFF and the jog dial 4 is pressed, a personal computer 1 starts processing of the predetermined software or the script file set up beforehand, for example.

[0056] Thus, in a personal computer 1, since the jog dial 4 has a programmable power key (PPK) function, it is not necessary to prepare the key of dedication.

[0057] Drawing 6 is drawing explaining the configuration which are display-program 54F which a personal computer 1 performs, and reading program 54G. Display-program 54F contain the processing manager 151, the contents manipulation routine 152-1 or 152-N and the icon manipulation routine 153-1 thru/or manipulation routines, such as 153-N.

[0058] The processing manager 151 computes the location which displays the thumbnail corresponding to the file read from the memory stick 116 based on the input event supplied from a touchpad 6 or OS54E, and supplies the contents manipulation routine 152-1 thru/or 152-N. In addition to the location of right and left and the upper and lower sides, the display position of the thumbnail which the processing manager 151 supplies to the contents manipulation routine 152-1 thru/or 152-N contains depth

(when an imagination distance from the front face of LCD7 is shown and thumbnails overlap, magnitude in case which thumbnail is displayed or a thumbnail displays is determined) on LCD7.

[0059] The processing manager 151 controls the period of a display of the thumbnail of the contents manipulation routine 152-1 thru/or 151-N.

[0060] The processing manager 151 computes the location which displays an icon based on the input event supplied from a touchpad 6 or OS54E, and supplies the icon manipulation routine 153-1 thru/or 153-N. The processing manager 151 controls the period of a display of the icon of the icon manipulation routine 153-1 thru/or 153-N.

[0061] The processing manager 151 directs display conditions (the display position of a thumbnail, the period of a display, color of an image, etc.) to the contents manipulation routine 152-1 thru/or 152-N based on the input event supplied from a touchpad 6 or OS54E.

[0062] The processing manager 151 demands processing of the copy and deletion to the file corresponding to the thumbnail which the contents manipulation routine 152-1 thru/or 152-N show, or a transfer of OS54E corresponding to the input of a touchpad 6 etc.

[0063] The number corresponding to the number corresponding to the file which read the contents manipulation routine 152-1 thru/or 152-N from the memory stick 116 corresponding to the demand from reading program 54G is started.

[0064] For example, when reading of four files from the memory stick 116 by reading program 54G is completed, reading program 54G require the contents manipulation routine 152-1 thru/or starting of 152-4. For example, when reading of eight files from the memory stick 116 by reading program 54G is completed, reading program 54G require the contents manipulation routine 152-1 thru/or starting of 152-8.

[0065] Thus, the contents manipulation routine 152-1 thru/or 152-N of a number corresponding to the file which reading by reading program 54G from a memory stick 116 ended is started. In fact, when display-program 54F repeat and perform the routine of only a predetermined count's contents processing of one routine, it seems that the contents manipulation routine 152-1 thru/or 152-N are operating.

[0066] The contents manipulation routine 152-1 displays on LCD7 one thumbnail corresponding to one file read from the memory stick 116 based on directions of the processing manager 151. The contents manipulation routine 152-2 displays on LCD7 one thumbnail corresponding to one file read from the memory stick 116 based on directions of the processing manager 151. Each of the contents manipulation routine 152-3 thru/or 152-N displays on LCD7 similarly one thumbnail corresponding to one file read from the memory stick 116 based on directions of the processing manager 151.

[0067] Thus, each of the contents manipulation routine 152-3 thru/or 152-N displays one thumbnail on LCD7 based on directions of the processing manager 151, respectively.

[0068] The number corresponding to the number corresponding to the icon which the icon manipulation routine 153-1 thru/or 153-N mention later is started.

[0069] The icon manipulation routine 153-1 displays one icon on LCD7 based on directions of the processing manager 151. The icon manipulation routine 153-2 displays other one icon on LCD7 based on directions of the processing manager 151. Each of the icon manipulation routine 153-3 thru/or 153-N displays one icon different, respectively on LCD7 similarly based on directions of the processing manager 151.

[0070] Thus, each of the icon manipulation routine 153-1 thru/or 153-N displays one icon on LCD7 based on directions of the processing manager 151, respectively.

[0071] Reading program 54G supply the data stored in the file at either the contents manipulation routine 152-3 which was made to start any one of the contents manipulation routine 152-3 thru/or the 152-N, and was started thru/or 152-N, when reading of one file from a memory stick 116 is completed.

[0072] Moreover, when a file is read from the communication networks 80, such as the Internet, you may make it reading program 54G supply the data stored in the file at either the contents manipulation routine 152-3 which was made to start any one of the contents manipulation routine 152-3 thru/or the 152-N, and was started thru/or 152-N.

[0073] Hereafter, when it is not necessary to distinguish the contents manipulation routine 152-3 thru/or 152-N separately, the contents manipulation routine 152 is only called. In addition, it may be made to perform the contents manipulation routine 152-3 thru/or 152-N as a different task performed by juxtaposition, respectively. Hereafter, when it is not necessary to distinguish the icon manipulation routine 153-1 thru/or 153-N separately, the icon manipulation routine 153 is only called.

[0074] Hereafter, corresponding to the actuation to the personal computer 1 assumed as normal operation, the screen which display-program 54F display on LCD7 is explained in order.

[0075] Drawing 7 thru/or drawing 9 are drawings explaining the screen displayed on LCD7, when the memory stick slot 115 is equipped with the memory stick 116 ten files are remembered to be and display-program 54F start.

[0076] When one file is read from a memory stick 116, reading program 54G start one contents manipulation routine 152, and display the thumbnail corresponding to the data stored in the file read into display-program 54F.

[0077] After starting of display-program 54F, drawing 7 is drawing showing the example of the screen which display-program 54F display on LCD7, when reading of three of ten files from the memory stick 116 by reading program 54G is completed.

[0078] A thumbnail 201-1 is displayed by the contents manipulation routine 152-1, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the beginning from the memory stick 116. A thumbnail 201-2 is displayed by the contents manipulation routine 152-2, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 2nd from the memory stick 116. A thumbnail 201-3 is displayed by the contents manipulation routine 152-3, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 3rd from the memory stick 116.

[0079] A thumbnail 201-1 thru/or 201-3 are arranged on the spiral of imagination so that it may mention later. Hereafter, when it is not necessary to distinguish a thumbnail 201-1 thru/or 201-N separately, a thumbnail 201 is only called.

[0080] The contents manipulation routine 152 generates a thumbnail 201 corresponding to the class of data supplied from reading program 54G.

[0081] For example, the contents manipulation routine 152 generates a thumbnail 201 based on the image of the beginning of a dynamic image, when the data of a dynamic image are supplied from reading program 54G.

[0082] The contents manipulation routine 152 generates a thumbnail 201 from the data of a static image, when the data of the static image of TIFF (Tag Image File Format) or a GIF (Graphic Interchange Format) method are supplied. The contents manipulation routine 152 uses the data of the thumbnail stored in the header, when the data of the static image of a JPEG (Joining Photographic Experts Group) method are supplied.

[0083] When the data of voice or a text are supplied from reading program 54G, based on the data of voice or a text, the contents manipulation routine 152 generates an image and uses it as a thumbnail 201. The contents manipulation routine 152 mentions later the processing which generates the image as a thumbnail 201 corresponding to audio data or the data of a text.

[0084] The icon for directing arrangement of a thumbnail 201 is displayed on the screen bottom which display-program 54F display on LCD7. An icon 202-1 is an icon for directing the display which arranges a thumbnail 201 on the straight line of imagination to display-program 54F. An icon 202-2 is an icon for directing the display which arranges a thumbnail 201 on the periphery of the perfect circle of imagination, or an ellipse to display-program 54F. An icon 202-3 is an icon for directing the display which arranges a thumbnail 201 in the shape of a grid to display-program 54F. An icon 202-4 is an icon for directing the display which arranges a thumbnail 201 on the spiral of imagination to display-program 54F.

[0085] Since an icon 202-4 is chosen and it is arranged in the center of the bottom of a screen, display-program 54F are arranged on a thumbnail 201-1 thru/or the spiral of imagination of 201-3. Hereafter, when it is not necessary to distinguish an icon 202-1 thru/or 202-4 separately, an icon 202 is only called.

[0086] Display-program 54F perform processing to a thumbnail 201-1 thru/or the file corresponding to 201-3, when the jog dial 4, a keyboard 5, or a touchpad 6 is operated and a thumbnail 201-1 thru/or the processing to the file corresponding to 201-3, for example, an enlarged display, playback, presenting of attribute information, copy, deletion, a transfer, etc. are required. For example, the processing manager 151 demands processing of the copy and deletion to a thumbnail 201-1 thru/or the file corresponding to 201-3, or a transfer of OS54E corresponding to the input of a touchpad 6 etc.

[0087] After starting of display-program 54F, drawing 8 is drawing showing the example of the screen which display-program 54F display on LCD7, when reading of seven of ten files from the memory stick 116 by reading program 54G is completed.

[0088] A thumbnail 201-4 is displayed by the contents manipulation routine 152-4, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 4th from the memory stick 116. A thumbnail 201-5 is displayed by the contents manipulation routine 152-5, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 5th from the memory stick 116.

[0089] A thumbnail 201-6 is displayed by the contents manipulation routine 152-6, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 6th from the memory stick 116. A thumbnail 201-7 is displayed by the contents manipulation routine 152-7, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 7th from the memory stick 116.

[0090] A thumbnail 201-1 thru/or 201-7 are arranged on the spiral of imagination.

[0091] Display-program 54F perform processing to a thumbnail 201-1 thru/or the file corresponding to 201-7, when the jog dial 4, a keyboard 5, or a touchpad 6 is operated and a thumbnail 201-1 thru/or the processing to the file corresponding to 201-7, for example, an enlarged display, playback, presenting of attribute information, copy, deletion, a transfer, etc. are required. For example, the processing manager 151 demands processing of the copy and deletion to a thumbnail 201-1 thru/or the file corresponding to 201-7, or a transfer of OS54E corresponding to the input of a touchpad 6 etc.

[0092] After starting of display-program 54F, drawing 9 is drawing showing the example of the screen which display-program 54F display on LCD7, when reading of all the files from the memory stick 116 by reading program 54G is completed.

[0093] A thumbnail 201-8 is displayed by the contents manipulation routine 152-8, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 8th from the memory stick 116. A thumbnail 201-9 is displayed by the contents manipulation routine 152-9, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 9th from the memory stick 116. A thumbnail 201-10 is displayed by the contents manipulation routine 152-10, and consists of images corresponding to the data stored in FAIRU which reading program 54G read into the 10th from the memory stick 116.

[0094] A thumbnail 201-1 thru/or 201-10 are arranged on the spiral of imagination.

[0095] Display-program 54F perform processing to a thumbnail 201-1 thru/or the file corresponding to 201-10, when the jog dial 4, a keyboard 5, or a touchpad 6 is operated and a thumbnail 201-1 thru/or the processing to the file corresponding to 201-10, for example, an enlarged display, playback, presenting of attribute information, copy, deletion, a transfer, etc. are required. For example, the processing manager 151 demands processing of the copy and deletion to a thumbnail 201-1 thru/or the file corresponding to 201-10, or a transfer of OS54E corresponding to the input of a touchpad 6 etc.

[0096] Thus, if reading program 54G read a file from a memory stick 116, since display-program 54F will display the thumbnail 201 corresponding to the data stored in the read file in order, the user of a personal computer 1 can know the contents of the file memorized by the memory stick 116, and the condition of reading of the file in the time.

[0097] Display-program 54F will perform processing required of the processing to the file read at the time corresponding to the demand, if reading program 54G read a file from a memory stick 116.

[0098] Moreover, it can opt for the actuation which reading of a file performs to a degree based on the thumbnail 201 as which the user was displayed since display-program 54F displayed the thumbnail 201 corresponding to the data stored in the read file in order at the latest.

[0099] It is the same as that of the processing which can be performed to the thumbnail 201-1 thru/or the file corresponding to 201-10 in the condition indicate it in drawing 9 as the processing which can be performed to the thumbnail 201-1 thru/or the file corresponding to 201-7 in the condition which shows the processing which can be performed in drawing 8 to the thumbnail 201-1 thru/or the file corresponding to 201-3 in the condition which shows in drawing 7.

[0100] Next, the thumbnail 201 which displays voice or the image corresponding to the data of a text is explained. As shown in the left-hand side of drawing 10, the icon corresponding to the voice currently recorded beforehand etc. was displayed conventionally. In this case, even if it gave an indication corresponding to the data of two or more voice, the same icon was only displayed corresponding to that number.

[0101] On the other hand, as shown in the right-hand side of drawing 10, display-program 54F generate the image corresponding to voice or the data of a text itself, and display it as a thumbnail 201.

[0102] Drawing 11 is drawing explaining the procedure which generates the thumbnail 201 as which the contents manipulation routine 152 displays the image corresponding to audio data.

[0103] First, the contents manipulation routine 152 sets up the field which a thumbnail 201 displays corresponding to the magnitude of the thumbnail 201 to display. The contents manipulation routine 152 divides the field which a thumbnail 201 displays into the field of the rectangle which consists of a predetermined number of pixels corresponding to the magnitude of audio data.

[0104] From audio data, the contents manipulation routine 152 extracts the data (for example, data located in the center of a data stream when audio data are seen as a data stream) of the part of arbitration, and generates the pixel value of a pixel based

on the extracted data. For example, the contents manipulation routine 152 cuts down data in a 8-bit unit from audio data, and regards it as the data of RGB.

[0105] In the example of drawing 11, 0fh (** to which the numeric value expressed in hexadecimals finally gives h hereafter) started from audio data is used as the data of R, 7eh is used as the data of G, and the data of the 57h B are carried out. Similarly, in the data following 0fh, 7eh, and 57h, 12h is used as the data of R, and 25h is used as the data of G, and let 98h be data of B.

[0106] The contents manipulation routine 152 generates the data of RGB from the data of the voice ** and encoded [encipher or] which do not process decode etc., when audio data are enciphered or encoded.

[0107] Thus, the contents manipulation routine 152 generates pixel values, such as data of RGB of the same number as the number of the fields where the thumbnail was divided.

[0108] The contents manipulation routine 152 sets the data of RGB as each of the field of the rectangle which consists of a predetermined number of pixels which divided the field which a thumbnail 201 displays. At this time, a thumbnail 201 consists of images of a different color for every rectangle, as an example is shown in the image 1 of drawing 11.

[0109] The contents manipulation routine 152 applies the Buller processing (the so-called processing of a shading off) to the thumbnail 201 to which the data of RGB were set. By obscuring the thumbnail 201 to which the data of RGB were set, as an example is shown in the image 2 of drawing 11, it is effective in the displayed thumbnail 201 becoming legible.

[0110] Which image processings, such as not only processing of a shading off but embossing and a profile extract, are sufficient as the processing added to the thumbnail 201 to which the data of RGB were set.

[0111] Further, the contents manipulation routine 152 overwrites the data of attributes, such as a title contained in the audio file, an artist name, or playback time amount, in a text at a position, as an example is shown in the image 3 of drawing 11.

[0112] Since the contents manipulation routine 152 overwrites in a text the data of attributes, such as a title contained in the audio file, an artist name, or playback time amount, the user who looked at the thumbnail 201 corresponding to audio data can know further the contents of the data of the voice corresponding to a thumbnail 201 in a detail.

[0113] Moreover, you may make it generate the image set as a thumbnail 201 based on the spectrum to audio data. For example, the color (for example, -40dB is made to correspond to the color of 0 times of a hue circle, and 0dB is made to correspond to the color of 360 degrees of a hue circle) corresponding to the level of each frequency band can be set as the pixel of the list beside a thumbnail 201, and the image corresponding to the elapsed time of an audio spectrum can be set as the thumbnail 201 whole by making the list of the length of a thumbnail 201 correspond to audio elapsed time.

[0114] As shown in drawing 12, when audio data are small, the contents manipulation routine 152 divides into the field of a small number of rectangle the field which displays a thumbnail 201, and when audio data are large, it divides into the field of many rectangles the field which displays a thumbnail 201.

[0115] By doing in this way, the user of a personal computer 1 only looked at the thumbnail 201 corresponding to audio data, and can predict the magnitude of audio data.

[0116] As shown in drawing 13, the contents manipulation routines 152 are the procedure which generates the thumbnail 201 corresponding to audio data, and the same procedure, and generate a thumbnail 201 based on the data of a text. In this case, the contents manipulation routine 152 extracts the text of the main point when the text contained in the data of a text was beforehand defined as a text displayed on contents 201, and you may make it display it.

[0117] Thus, display-program 54F can generate a thumbnail 201 corresponding to audio data or the data of a text.

[0118] In addition, display-program 54F can generate a thumbnail 201 corresponding to the data for the data which do not contain audio data or not only the data of a text but an image, for example, the data stored in the HTML (Hypertext Markup Language) file, and a spreadsheet, or an executive program (load module).

[0119] Next, arrangement of the thumbnail 201 which display-program 54F display is explained.

[0120] When displaying the information attached to a thumbnail and a thumbnail conventionally, as shown in drawing 14, it was common to arrange so that a thumbnail may not be lapped, and to have displayed the information which is attached to the near at a thumbnail.

[0121] on the other hand, the method of presentation (a square view is called hereafter) arranged in the shape of a grid so that display-program 54F of a personal computer 1 may not lap a thumbnail 201 — in addition, it has the gestalt of three kinds of displays which pile up and display a thumbnail 201.

[0122] In the gestalt of the 1st display, the straight line or curve (open line) of imagination is specified, and a thumbnail 201 is arranged on the straight line of imagination, or a curve (the Rhine view is called hereafter). In the gestalt of the 2nd display, the perfect circle or ellipse (closed line) of imagination is specified, and a thumbnail 201 is arranged at the perfect circle or ellipse of imagination (a loop-formation view is called hereafter). In the gestalt of the 3rd display, the spiral of imagination is specified and a thumbnail 201 is arranged at the spiral of imagination (a spiral view is called hereafter).

[0123] First, the Rhine view displayed when it clicks on an icon 202-1 is explained. As shown in drawing 15, display-program 54F specify the shaft 221-1 which consists of a straight line or a curve, and arrange a thumbnail 201-1 thru/or 201-3 based on a shaft 221-1. When the thumbnail 201-1 is chosen and a thumbnail 201-1 and a thumbnail 201-2 lap, display-program 54F display the whole thumbnail 201-1, and display only the part which does not lap with the thumbnail 201-1 of a thumbnail 201-2.

[0124] When a thumbnail 201-1 is chosen, a thumbnail 201-1 thru/or 201-3 are arranged in order and a thumbnail 201-2 and a thumbnail 201-3 lap, display-program 54F display only the part which does not lap with the thumbnail 201-1 of a thumbnail 201-2, and display only the part which does not lap with the thumbnail 201-2 of a thumbnail 201-3.

[0125] namely, the thumbnail 201 near the thumbnail 201 chosen from the thumbnail 201 which display-program 54F displayed the whole thumbnail 201 chosen, and is separated from the thumbnail 201 chosen — being preferential (it arranging in the location near a user — as) — it displays.

[0126] The text 211-1 in which the magnitude of the information which accompanies the data corresponding to a thumbnail 201-1, for example, a file name, the creation date, and an image etc. is shown is arranged for example, on the shaft 221-2 the location of the thumbnail 201-1 bottom and whose location of a text 211-1 top correspond. The text 211-2 in which the information which accompanies the data corresponding to a thumbnail 201-2, for example, a file name etc., is shown is arranged for example, on the shaft 221-2 the location of the thumbnail 201-2 bottom and whose location of a text 211-2 top correspond. The text 211-3 in which the information which accompanies the data corresponding to a thumbnail 201-3, for example, a file name etc., is shown is arranged for example, on the shaft 221-2 the location of the thumbnail 201-3 bottom and whose location of a text 211-3 top correspond.

[0127] In addition, a shaft 221-1 and a shaft 221-2 are not displayed on the screen of LCD7. Hereafter, when it is not necessary

to distinguish a shaft 221-1 and a shaft 221-2 separately, a shaft 221 is only called. Hereafter, when it is not necessary to distinguish a text 211-1 thru/or 211-3 separately, a text 211 is only called.

[0128] For example, when the horizontal direction of a x axis and a screen is made into the y-axis, as the horizontal direction of a screen is shown in drawing 16, a shaft 221-1 is computed by the formula (1), and a shaft 221-2 is computed by the formula (2).

[0129]

$$x = \sin(\pi/2t) (y - c0) + c1 \quad (1)$$

$$x = -\sin(\pi/2t) (y - c0) + c1 \quad (2)$$

Here, x shows the coordinate on a x axis and y shows the coordinate on the y-axis. t is the elapsed time from predetermined criteria time of day (for example, time of day when a display is started with the Rhine view), and c0 and c1 show the location of the core of the thumbnail chosen.

[0130] theta shown in drawing 16 corresponds to $\pi/2t$ of a formula (1) or a formula (2).

[0131] When a display is started by arrangement of the thumbnail 201 and the text 211 which are shown in drawing 17 (B) based on the location of the shaft 221-1 and the shaft 221-2 which follow, for example, are shown in drawing 17 (A), it moves smoothly toward the location shown in drawing 17 (C), and the location of a shaft 221-1 and a shaft 221-2 is further moved smoothly toward the location shown in drawing 17 (E).

[0132] That is, a thumbnail 201 and a text 211 move smoothly toward the arrangement shown in drawing 17 (D) from the arrangement shown in drawing 17 (B) corresponding to migration of a shaft 221-1 and a shaft 221-2, and move to the arrangement shown in drawing 17 (F) smoothly further.

[0133] It moves smoothly toward the location shown in drawing 17 (C), and moves smoothly further toward the location shown in drawing 17 (A), and the location of a shaft 221-1 and a shaft 221-2 repeats migration smoothly, when it arrives at the location shown in drawing 17 (E).

[0134] That is, a thumbnail 201 and a text 211 move smoothly toward the arrangement shown in drawing 17 (D) from the arrangement shown in drawing 17 (F) corresponding to migration of a shaft 221-1 and a shaft 221-2, move to the arrangement shown in drawing 17 (B) smoothly further, and repeat migration smoothly as mentioned above.

[0135] Since the thumbnail 201 which the user has chosen since the thumbnail 201 chosen as the core of migration of a shaft 221-1 is arranged does not move but the thumbnail 201 arranged up and down moves, a user can recognize the chosen thumbnail 201 quickly and certainly.

[0136] Next, the loop-formation view displayed when it clicks on an icon 202-2 is explained. As shown in drawing 18, display-program 54F specify a perfect circle, an ellipse, or the shaft 241-1 that consists of a predetermined loop formation (a polygon is included), and arrange a thumbnail 201-1 thru/or 201-5 based on a shaft 241-1. When the thumbnail 201-3 is chosen and a thumbnail 201-3 and a thumbnail 201-2 lap, display-program 54F display the whole thumbnail 201-3, and display only the part which does not lap with the thumbnail 201-3 of a thumbnail 201-2.

[0137] When a thumbnail 201-3 is chosen, a thumbnail 201-1 thru/or 201-5 are arranged in order and a thumbnail 201-2 and a thumbnail 201-1 lap, display-program 54F display only the part which does not lap with the thumbnail 201-3 of a thumbnail 201-2, and display only the part which does not lap with the thumbnail 201-2 of a thumbnail 201-1. Display-program 54F display only the part which does not lap with the thumbnail 201-3 of a thumbnail 201-4, and display only the part which does not lap with the thumbnail 201-4 of a thumbnail 201-5.

[0138] namely, the thumbnail 201 near the thumbnail 201 chosen from the thumbnail 201 which display-program 54F displayed the whole thumbnail 201 chosen, and is separated from the thumbnail 201 chosen — being preferential (it arranging in the location near a user — as) — it displays.

[0139] Display-program 54F specify the shaft 241-2 corresponding to a shaft 241-1. The text 211-1 corresponding to a thumbnail 201-1 is arranged for example, on the shaft 241-2 the location of the core of right and left of a thumbnail 201-1 and whose location of the core of a text 211-1 correspond. The text 211-2 corresponding to a thumbnail 201-2 is arranged on the shaft 241-2 the location of the core of right and left of a thumbnail 201-2 and whose location of the core of a text 211-2 correspond. Similarly, the text 211-3 corresponding to a thumbnail 201-3 thru/or 201-5 thru/or each of 211-5 are arranged a thumbnail 201-3 thru/or 201-5 on the location of the core of each right and left, and a text 211-3 thru/or the 211 shaft 241-2 whose location of the core of -5 corresponds, respectively.

[0140] In addition, a shaft 241-1 and a shaft 241-2 are not displayed on the screen of LCD7. Hereafter, when it is not necessary to distinguish a shaft 241-1 and a shaft 241-2 separately, a shaft 241 is only called.

[0141] Display-program 54F are displayed on LCD7 focusing on the thumbnail 201 chosen among the thumbnail 201 arranged at the shaft 241-1, and the text 211 arranged at the shaft 241-2, as shown in drawing 19.

[0142] Drawing 20 is drawing explaining the processing which computes the shaft 241-1 and shaft 241-2 which are display-program 54F in case a shaft 241-1 and a shaft 241-2 are circles.

[0143] When the number of the thumbnails 201 to display is set to n, the radius r of the circle corresponding to a shaft 241-1 and a shaft 241-2 is searched for by the formula (3).

[0144]

$$r = 64n/2\pi \quad (3)$$

64 contained in a formula (3) is a constant corresponding to spacing of a thumbnail.

[0145] When the coordinate of the core of a screen is set to (Xcent, Ycent), the coordinate (Xcent1, Ycent1) of the core of a shaft 241-1 is shown by the formula (4), and the coordinate (Xcent2, Ycent2) of the core of a shaft 241-2 is shown by the formula (5).

[0146]

$$(Xcent1, Ycent1) = (Xcent, Ycent - r/64) \quad (4)$$

$$(Xcent1, Ycent1) = (Xcent, Ycent + r/64) \quad (5)$$

The location of the i-th thumbnail 201 is called for by the formula (6).

[0147]

$$(X1i, Y1i) = (Xcent1 + r \sin(i * 2 \pi / n), Ycent1 + r \cos(i * 2 \pi / n)) \quad (6)$$

The location of the i-th text 211 is called for by the formula (7).

[0148]

$$(X2i, Y2i) = (Xcent2 + r \sin(i * 2 \pi / n), Ycent2 - r \cos(i * 2 \pi / n)) \quad (7)$$

In a loop-formation view, when display-program 54F change arrangement of a thumbnail 201 corresponding to actuation of the jog dial 4, there is an advantage that a user tends to grasp migration of a thumbnail 201 intuitively.

[0149] Next, the spiral view displayed when it clicks on an icon 202-4 is explained. As shown in drawing 21, display-program 54F specify the shaft 261 which consists of a spiral, and arrange a thumbnail 201-1 thru/or 201-3 and a text 211-1 thru/or 221-3 based on a shaft 261. A shaft 261 has the location of the depth direction to a screen. Even if a thumbnail 201 is the same magnitude, the magnitude displayed on LCD7 by the location arranged will differ.

[0150] Since the distance from a screen is arranged in the shortest location, the thumbnail 201 chosen is displayed greatly. Display-program 54F are smaller displayed as compared with the thing which the thumbnail 201 chosen is displayed [thing] greatly and is having the thumbnail 201 which is not chosen chosen.

[0151] Therefore, since display-program 54F display small the thumbnail 201 to which it is large and the user is not observing the thumbnail 201 which the user is observing, displaying many thumbnails 201, the screen of LCD7 is used more efficiently.

[0152] Or display-program 54F specify the shaft 261-1 and shaft 261-2 which consist of the spiral which has the same shaft, and arrange a thumbnail 201 based on a shaft 261-1, and you may make it arrange a text 211 based on a shaft 261-2 for example, as shown in drawing 22 (A).

[0153] The coordinate (x y, z) of the shaft 261 which consists of the spiral whose radius is r is searched for by the formula (8), the formula (9), and the formula (10).

[0154]

$$x = r \sin(t) + c_0 t \quad (8)$$

$$y = c_1 t \quad (9)$$

$$z = r \cos(t) \quad (10)$$

Here, r is a spiral radius, c₀ and c₁ are constants which determine a spiral inclination, and t is any value.

[0155] As shown in drawing 23, the coordinate (xi, yi, zi) of the thumbnail 201 arranged on the shaft 261 which consists of the spiral whose radius is r is searched for by the formula (11), the formula (12), and the formula (13).

[0156]

$$xi = X_{cent} + r \sin(i * 2\pi / 9) - (i * r / 20) \quad (11)$$

$$yi = Y_{cent} + (i * r / 10) \quad (12)$$

$$zi = r - r \cos(i * 2\pi / 9) \quad (13)$$

Here, X_{cent} and Y_{cent} show the coordinate of the core of a screen. The z-axis is an axis of coordinates right-angled to a x axis and the y-axis corresponding to depth to a screen. 20 of a formula (11) and 10 of a formula (12) are predetermined constants.

[0157] Next, the square view displayed when it clicks on an icon 202-3 is explained. As shown in drawing 24 and drawing 25, as a train of the top of a screen, the location of display-program 54F of each core of the vertical direction corresponds, and they arrange five thumbnails 201-1 thru/or 201-5 so that spacing of a lateral center position may become a predetermined distance.

[0158] As 2nd train of a screen, the location of display-program 54F of each core of the vertical direction corresponds, and they arrange five thumbnails 201-6 thru/or 201-10 so that spacing of a lateral center position may become a predetermined distance. In other words, the center position of the longitudinal direction of a thumbnail 201-6 is in agreement with the center position of the longitudinal direction of a thumbnail 201-1. The center position of the longitudinal direction of a thumbnail 201-7 is in agreement with the center position of the longitudinal direction of a thumbnail 201-2. The center position of the longitudinal direction of a thumbnail 201-8 is in agreement with the center position of the longitudinal direction of a thumbnail 201-3. In accordance with the center position of the longitudinal direction of a thumbnail 201-4, the center position of the longitudinal direction of a thumbnail 201-9 so that the center position of the longitudinal direction of a thumbnail 201-10 may be in agreement with the center position of the longitudinal direction of a thumbnail 201-5. Display-program 54F arrange five thumbnails 201-6 thru/or 201-10 in the 2nd train of a screen.

[0159] Display-program 54F are the same processing as the 3rd train of a screen, and 4th train, and arrange a thumbnail 201-11 thru/or 201-20.

[0160] In addition, display-program 54F can rearrange a thumbnail 201 in the Rhine view, a loop-formation view, a spiral view, or a square view based on the magnitude of the creation date, photography time of day, a file name, and an image etc.

[0161] Next, the migration of an icon 202 when clicking on an icon 202 is explained. Drawing 26 is drawing explaining the example of migration of an icon 202.

[0162] When an icon 202-1 thru/or 202-3 are arranged on the screen as shown in the right-hand side of drawing 26 for example, and it clicks on an icon 202-1, While making the configuration or color of an icon 202-1 change and reproducing predetermined voice, display-program 54F move an icon 202-1 and an icon 202-2 so that the location of an icon 202-1 and the location of an icon 202-2 may be made to change.

[0163] That is, when a touchpad 6 is clicked, the processing manager 151 is a predetermined period, and he computes the location of an icon 202-1, and the location of an icon 202-2 so that an icon 202-1 and an icon 202-2 may move.

[0164] It is displayed that the icon manipulation routine 153-1 moves an icon 202-1 in the center of a screen based on the location which the processing manager 151 computed. It is displayed that the icon manipulation routine 153-2 moves an icon 202-2 to the lower left of a screen based on the location which the processing manager 151 computed.

[0165] You may make it an icon 202-1 thru/or migration of 202-3 move not only in linear migration but in a predetermined curve top. You may make it an icon 202-1 thru/or the direction of migration of 202-3 include the depth direction not only to the same flat-surface top as the screen to display but to a screen.

[0166] When the thumbnail 201 is displayed by the loop-formation view, as shown in drawing 27 (A), display-program 54F arrange an icon 202-2 in the center of the longitudinal direction of a screen. In the condition which shows in drawing 27 (A), when it clicks on an icon 202-1, by the user, display-program 54F are the rate which can be checked visually, and move an icon 202-1 thru/or 202-4. Through the condition which shows in drawing 27 (B), display-program 54F arrange an icon 202-1 in the center of the longitudinal direction of a screen, as shown in drawing 27 (C).

[0167] Display-program 54F arrange an icon 202-2 thru/or each of 202-4 based on the numeric value connected with an icon 202-2 thru/or each of 202-4.

[0168] For example, when 1 is matched with an icon 202-1, 2 is matched with an icon 202-2, 3 is matched with an icon 202-3 and 4 is matched with the icon 202-4, display-program 54F arrange an icon 202-2 thru/or 202-4 from the left-hand side of a screen in order with the small numeric value matched. That is, display-program 54F arrange an icon 202-2 on the left-hand side of a screen, arrange an icon 202-3 on the right-hand side of an icon 202-2, and arrange an icon 202-4 on the right-hand side of an icon 202-3.

[0169] Thus, when display-program 54F move an icon 202 and arrange the icon 202 corresponding to the mode of a display in the center of a screen, while a user can know certainly that actuation was added to the icon 202, the mode of a display of a

thumbnail 201 can be known quickly.

[0170] Next, the display of the after-image accompanying migration of a thumbnail 201 or an icon 202 is explained. The contents manipulation routine 152 draws a thumbnail 202 30 times in 1 second. As shown in [drawing 28](#), the contents manipulation routine 152 displays the after-image corresponding to the last drawing on a screen, when moving a thumbnail 202.

[0171] When the display of an after-image is not set up, the contents manipulation routine 152 eliminates a current screen, and newly draws a thumbnail 202.

[0172] As an example is shown in [drawing 29](#), when the display of an after-image is set up and a thumbnail 202 is drawn, the contents manipulation routine 152 sets up the lightness of the screen displayed last time to 80%, and draws. It describes with the contents manipulation routine 152 overwriting a thumbnail 202 on the screen on which lightness was set up to 80%.

[0173] Therefore, since the contents manipulation routine 152 lowers the lightness of the screen drawn last time at every drawing and draws when a thumbnail 202 is moved, an after-image will be displayed. By performing such processing, display-program 54F can display an after-image in the smaller amount of operations.

[0174] [Drawing 30](#) is drawing explaining change of the condition corresponding to the display position of the thumbnail 201 or icon 202 at the time of moving a thumbnail 201 or an icon 202. For example, in [drawing 30](#), Condition A corresponds to a loop-formation view, and Condition B corresponds to a square view.

[0175] In the condition A corresponding to a loop-formation view, when it clicks on an icon 202-3, the processing manager 151 computes each location of the thumbnail 201-1 which the contents manipulation routine 152-1 thru/or 152-N draw next thru/or 201-N, and supplies each of the contents manipulation routine 152-1 thru/or 152-N.

[0176] The processing manager 151 computes the location of a thumbnail 201 based on the transition function which shows a graph to [drawing 31](#). When distance of the location of the thumbnail 201 in Condition B is set to 1 from the location of the thumbnail 201 in Condition A, a transition function outputs the distance of the thumbnail 201 in the elapsed time t from the location of the thumbnail 201 in Condition B based on the elapsed time t from initiation of transition.

[0177] That is, when the location of the thumbnail 201 of Ai and Condition B is set to Bi for the location of the thumbnail 201 in elapsed time ti and Condition A, a location Ci is computed by the thumbnail 201 by the formula (14).

[0178]

$$C_i = (A_i - B_i)d(t_i) + B_i \quad (14)$$

[0179] Distance d(t) decreases rapidly from 1, and the transition function is defined as distance d's (t's) decreasing gently-sloping and being set to 0 after that as elapsed time t increases [elapsed time t] in the part near 0. Thus, by defining a transition function, when migration of a thumbnail 201 is started, display-program 54F move a thumbnail 201 quickly, and they move a thumbnail 201 slowly as they approach a migration place.

[0180] By doing in this way, display-program 54F can lose the sense of incongruity accompanying migration of a user's thumbnail 201 while moving a thumbnail 201 quickly.

[0181] In addition, any, such as a thing which elapsed time t increases [for example, not only a thing but the elapsed time t shown in [drawing 31](#)] in the part near 0 and which it is alike, therefore distance d(t) decreases gradually from 1, and distance d(t) decreases rapidly after that, and is set to 0, are sufficient as a transition function.

[0182] Corresponding to elapsed time t, based on a transition function, the processing manager 151 computes each location of the thumbnail 201-1 corresponding to distance d(t) thru/or 201-N, and supplies each of the contents manipulation routine 152-1 thru/or 152-N. Each of the contents manipulation routine 152-1 thru/or 152-N draws a thumbnail 201-1 thru/or 201-N.

[0183] In the condition C1 corresponding to elapsed time t1, each of a thumbnail 201-1 thru/or 201-N is displayed on the location in the middle of moving toward the location of the thumbnail 201-1 of Condition B thru/or 201-N. In the condition C2 corresponding to the elapsed time t2 in which predetermined time amount has passed since elapsed time t1, each of a thumbnail 201-1 thru/or 201-N is further displayed on the location in the middle of moving toward the location of the thumbnail 201-1 of Condition B thru/or 201-N.

[0184] In the condition C3 corresponding to the elapsed time t3 in which predetermined time amount passed, each of a thumbnail 201-1 thru/or 201-N is displayed on the location in the middle of migration of the nearer location of the location of the thumbnail 201-1 of Condition B thru/or 201-N from elapsed time t2.

[0185] The example of the location of the thumbnail 201 in a condition C1 and the location of the thumbnail 201 in a condition C2 is shown in [drawing 32](#).

[0186] When the input of the purport which should change in the Condition D is carried out while changing in the Condition B from Condition A, it changes in the Condition D from the condition in the middle of changing in the Condition B from Condition A.

[0187] For example, as shown in [drawing 33](#), when it clicks on an icon 202-4 in a condition C2, a condition C2 is made into a new initiation condition, and it changes toward the condition D corresponding to a spiral view. Transition to Condition D is performed via a condition E1 thru/or a condition E2 like the transition to the condition B from Condition A from a condition C2.

[0188] The processing manager 151 makes the location which a thumbnail 201 displays change in a spiral view, in the time of the jog dial 4, the keyboard 5, or the touchpad 6 being operated, and the time of the jog dial 4, the keyboard 5, and the touchpad 6 not being operated, as shown in [drawing 34](#).

[0189] Furthermore, the processing manager 151 makes the location which a thumbnail 201 displays change in a spiral view in the time (for example, for an arrow key to continuing being pushed) of a keyboard 5 etc. continuing and being pressed, and the time of a keyboard 5 etc. being pressed only once and detached immediately.

[0190] When the jog dial 4 and the keyboard 5 are not operated, the processing manager 151 makes the contents manipulation routine 152 more specifically display a thumbnail 201 on the spiral of the larger radius r, as shown in [drawing 35](#).

[0191] The jog dial 4 rotates continuously, or when a keyboard 5 is continuing being pressed, the processing manager 151 makes the contents manipulation routine 152 display a thumbnail 201 on the spiral of the smaller radius r, as shown in [drawing 36](#).

[0192] When the jog dial 4 rotated only one click, or a keyboard 5 is pressed only once and detached immediately, the processing manager 151 makes the contents manipulation routine 152 display a thumbnail 201 on the spiral of the middle radius r shown in [drawing 35](#) and [drawing 36](#).

[0193] The user of a personal computer 1 can judge immediately whether the jog dial 4 or the keyboard 5 is operated based on the display position of a thumbnail 201.

[0194] In addition, display-program 54F reproduce predetermined voice, or you may make it display a predetermined image with modification of the spiral radius r.

[0195] Moreover, the processing manager 151 displays a thumbnail 201 on the spiral of the smaller radius r, when the jog dial 4 and the keyboard 5 are not operated, and when the jog dial 4 or the keyboard 5 is operated, he may be made to make the

contents manipulation routine 152 display a thumbnail 201 on the spiral of the bigger radius r.

[0196] Next, it attaches and explains to selection and the enlarged display of a thumbnail 201.

[0197] Drawing 37 thru/or drawing 39 are drawings explaining the selection and the enlarged display of a thumbnail 201 in the Rhine view. the "condition that the thumbnail 201 as which M" is displayed is chosen" shown in drawing 37 — when the thumbnail 201 as which H" is displayed is clicked, display-program 54F are shown in drawing 38 — as — — all the thumbnails 201 currently displayed on the screen are moved so that the thumbnail 201 as which H" is displayed may be located at the core of a screen. Display-program 54F shift to the condition of having chosen the thumbnail 201 as which "H" is displayed.

[0198] the "condition that the thumbnail 201 as which H" is displayed is chosen" shown in drawing 38 — when the thumbnail 201 as which H" is displayed is clicked, display-program 54F are shown in drawing 39 — as — — the image corresponding to the thumbnail 201 as which H" is displayed is displayed.

[0199] That is, when the data corresponding to the thumbnail 201 as which "H" is displayed are a static image, display-program 54F display a static image in original size. When the data corresponding to the thumbnail 201 as which "H" is displayed are a dynamic image, display-program 54F display a dynamic image in original size, and reproduce a dynamic image. When the data corresponding to the thumbnail 201 as which "H" is displayed are voice, display-program 54F expand and display a thumbnail 201 on predetermined size, and reproduce voice.

[0200] It returns to the condition shown in drawing 39 that the thumbnail 201 "display-program 54F indicate the condition of a display to be to drawing 38 when the image corresponding to the thumbnail 201 as which H" is displayed is clicked" and as which H" is displayed is chosen.

[0201] Drawing 40 thru/or drawing 42 are drawings explaining the selection and the enlarged display of a thumbnail 201 in a loop-formation view. When the thumbnail 201 as which "Q" is displayed is clicked in the condition that the thumbnail 201 as which "M" shown in drawing 40 is displayed is chosen, display-program 54F move all the thumbnails 201 currently displayed on the screen so that the thumbnail 201 as which "Q" is displayed may be located at the core of the longitudinal direction of a screen, as shown in drawing 41 . Display-program 54F shift to the condition of having chosen the thumbnail 201 as which "Q" is displayed.

[0202] When the thumbnail 201 as which "Q" is displayed is clicked in the condition that the thumbnail 201 as which "Q" shown in drawing 41 is displayed is chosen, display-program 54F display the image corresponding to the thumbnail 201 as which "Q" is displayed, as shown in drawing 42 .

[0203] That is, when the data corresponding to the thumbnail 201 as which "Q" is displayed are a static image, display-program 54F display a static image in original size. When the data corresponding to the thumbnail 201 as which "Q" is displayed are a dynamic image, display-program 54F display a dynamic image in original size, and reproduce a dynamic image. When the data corresponding to the thumbnail 201 as which "Q" is displayed are voice, display-program 54F expand and display a thumbnail 201 on predetermined size, and reproduce voice.

[0204] If the image corresponding to the thumbnail 201 as which "Q" is displayed shown in drawing 42 is clicked, display-program 54F will be returned to the condition that the thumbnail 201 as which "Q" which shows the condition of a display to drawing 41 is displayed is chosen.

[0205] Drawing 43 thru/or drawing 45 are drawings explaining the selection and the enlarged display of a thumbnail 201 in a spiral view. When the thumbnail 201 as which "Z" is displayed is clicked in the condition that the thumbnail 201 as which "M" shown in drawing 43 is displayed is chosen, display-program 54F move all the thumbnails 201 currently displayed on the screen so that the thumbnail 201 as which "Z" is displayed may be located at the core of a screen, as shown in drawing 44 . Display-program 54F shift to the condition of having chosen the thumbnail 201 as which "Z" is displayed.

[0206] When the thumbnail 201 as which "Z" is displayed is clicked in the condition that the thumbnail 201 as which "Z" shown in drawing 44 is displayed is chosen, display-program 54F display the image corresponding to the thumbnail 201 as which "Z" is displayed, as shown in drawing 45 .

[0207] That is, when the data corresponding to the thumbnail 201 as which "Z" is displayed are a static image, display-program 54F display a static image in original size. When the data corresponding to the thumbnail 201 as which "Z" is displayed are a dynamic image, display-program 54F display a dynamic image in original size, and reproduce a dynamic image. When the data corresponding to the thumbnail 201 as which "Z" is displayed are voice, display-program 54F expand and display a thumbnail 201 on predetermined size, and reproduce voice.

[0208] If the image corresponding to the thumbnail 201 as which "Z" is displayed shown in drawing 45 is clicked, display-program 54F will be returned to the condition that the thumbnail 201 as which "Z" which shows the condition of a display to drawing 44 is displayed is chosen.

[0209] Drawing 46 thru/or drawing 48 are drawings explaining the selection and the enlarged display of a thumbnail 201 in a square view. When the thumbnail 201 as which "B" is displayed is clicked in the condition that the thumbnail 201 as which "M" shown in drawing 46 is displayed is chosen, display-program 54F move all the thumbnails 201 currently displayed on the screen so that the thumbnail 201 as which "B" is displayed may be located at the core of a screen, as shown in drawing 47 . Display-program 54F shift to the condition of having chosen the thumbnail 201 as which "B" is displayed.

[0210] When the thumbnail 201 as which "B" is displayed is clicked in the condition that the thumbnail 201 as which "B" shown in drawing 47 is displayed is chosen, display-program 54F display the image corresponding to the thumbnail 201 as which "B" is displayed, as shown in drawing 48 .

[0211] That is, when the data corresponding to the thumbnail 201 as which "B" is displayed are a static image, display-program 54F display a static image in original size. When the data corresponding to the thumbnail 201 as which "B" is displayed are a dynamic image, display-program 54F display a dynamic image in original size, and reproduce a dynamic image. When the data corresponding to the thumbnail 201 as which "B" is displayed are voice, display-program 54F expand and display a thumbnail 201 on predetermined size, and reproduce voice.

[0212] If the image corresponding to the thumbnail 201 as which "B" is displayed shown in drawing 48 is clicked, display-program 54F will be returned to the condition that the thumbnail 201 as which "B" which shows the condition of a display to drawing 47 is displayed is chosen.

[0213] Thus, when a thumbnail 201 is clicked, since display-program 54F choose the clicked thumbnail 201, or it expands, and they display or reproduce a dynamic image, simply and quickly, a user can choose desired data, and can display or reproduce them.

[0214] Next, transition of the condition in the case of changing from the condition shown in drawing 38 to the condition which shows in drawing 39 . Transition of the condition in the case of changing from the condition shown in drawing 41 to the condition

which shows in drawing 42 , Transition of the condition in the case of changing from the condition shown in drawing 44 to the condition which shows in drawing 45 , Or transition of the condition in the case of changing from the condition shown in drawing 47 to the condition which shows in drawing 48 , Transition of the condition in the case of changing from the condition shown in a list at drawing 39 to the condition which shows in drawing 38 , Transition of the condition in the case of changing from the condition shown in transition of the condition in the case of changing from the condition shown in transition of the condition in the case of changing from the condition shown in drawing 42 to the condition which shows in drawing 41 , and drawing 45 to the condition which shows in drawing 44 , or drawing 48 to the condition which shows in drawing 47 is explained.

[0215] Transition of the condition in the case of changing to the condition a condition shows in drawing 48 from the condition which shows in transition of the condition in the case of changing to the condition which shows in drawing 45 from the condition shown in transition of the condition in the case of changing to the condition which shows in drawing 42 from the condition shown in transition of the condition in the case of changing to the condition which shows in drawing 39 from the condition shown in drawing 38 , and drawing 41 , drawing 44 , or drawing 47 corresponds to the display of the static image the request by the user, a dynamic image, or voice, or the demand of playback. Since actuation of a thumbnail 201 etc. aims final at a display or playback of a static image, a dynamic image, or voice, this state transition can be said to be large [significance] for a user as shown in drawing 49 .

[0216] On the other hand, transition of the condition in the case of changing from the condition shown in drawing 39 to the condition which shows in drawing 38 , Transition of the condition in the case of changing from the condition shown in drawing 42 to the condition which shows in drawing 41 , Transition of the condition in the case of changing from the condition shown in transition of the condition in the case of changing from the condition shown in drawing 45 to the condition which shows in drawing 44 , or drawing 48 to the condition which shows in drawing 47 It is transition to the transitional condition aiming at actuation of selection of other thumbnails 201 which terminate a display or playback of a static image, a dynamic image, or voice etc. This state transition can be said to be small [significance] for a user as shown in drawing 49 .

[0217] Then, as shown in drawing 50 , when carrying out the state transition with a large significance for a user (for example, when indicating a desired static image, a dynamic image, or voice or reproducing), in order to make a user recognize carrying out display or playback certainly, display-program 54F are the rate a user can recognize change of a display to be visually, and change a display comparatively slowly.

[0218] On the other hand, when carrying out a state transition with a significance small for a user, the display of a desired static image, a dynamic image, or voice is suspended, or playback is suspended, and when changing into the display which a thumbnail 201 chooses, display-program 54F change a display quickly.

[0219] Thus, since display-program 54F perform quickly transition of the condition which is not comparatively important while making a user recognize transition of an important condition certainly, they can fill recognition of the state transition by the user, and the conflicting requirement of a quick response.

[0220] Next, the display about the thumbnail 201 chosen is explained. As shown in drawing 51 , display-program 54F display a frame 281 on the selected thumbnail 201, when a thumbnail 201 is chosen. Display-program 54F eliminate a frame 281 from the thumbnail 201 which is not chosen, when other thumbnails 201 are chosen.

[0221] Display-program 54F are made to correspond to the passage of time, and change the lightness of a frame 281, saturation, or a hue. Drawing 52 is drawing explaining the example of change of the lightness of a frame 281 corresponding to the passage of time, or saturation.

[0222] For example, display-program 54F change linearly the lightness of the frame 281 which is 0%, or saturation to 100% in 0.5 seconds, change linearly the lightness of the frame 281 which is 100%, or saturation to 0% in 0.5 seconds, and repeat this change.

[0223] The processing to which the lightness of a frame 281 is changed has little computational complexity as compared with the processing to which saturation or a hue is changed.

[0224] Drawing 53 is drawing explaining the example of modification of the hue of a frame 281 corresponding to the passage of time.

[0225] For example, display-program 54F change linearly the hue of the frame 281 corresponding to 0 times of a hue circle to 360 degrees in 1 second, return the hue of the frame 281 which reached 360 degrees of a hue circle to 0 times, and repeat this change.

[0226] Display-program 54F can make a user recognize the thumbnail 201 chosen certainly by doing in this way out of the screen where the thumbnail 201 which has variegated lightness, color, or a hue is displayed. The lightness of a frame 281, saturation, or the period of change of a hue is good the period which the user not only for 1 second but 0.1 seconds thru/or about 10 seconds can recognize.

[0227] Drawing 54 is drawing explaining the display of the attribute of the data corresponding to the thumbnail 201 chosen etc. If a thumbnail 201 is chosen, display-program 54F display a frame 281, and when predetermined time amount passes without operating a touchpad 6 etc., they will display attributes, such as a file name of the file in which the data corresponding to a thumbnail 201 are stored, a title of data, magnitude of data, and playback time amount, on the additive-attributes display 291.

[0228] Display-program 54F eliminate the frame 281 and the additive-attributes display 291 corresponding to the thumbnail 201, when the thumbnail 201 is not chosen.

[0229] For example, as shown in drawing 55 , display-program 54F display attributes, such as an icon which shows a file name, a static image, or a dynamic image, magnitude of data, and a date, on the additive-attributes display 291, when a thumbnail 201 is chosen and it passes for 1 second. In the example shown in drawing 55 , the additive-attributes display 291 is considering the frame and background as the translucent display, in order that a user may enable the check of other thumbnails 201 which are not chosen.

[0230] Next, the mode of the full screen display displayed on whole LCD7 is explained. When it starts, display-program 54F display a thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7, as shown in drawing 56 .

[0231] If a predetermined icon or the predetermined key of a keyboard 5 is operated, display-program 54F will display a thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, as shown in drawing 57 . When display-program 54F show the image to all of the viewing areas of the screen of LCD7, a personal computer 1 receives an input as actuation to display-program 54F, when the jog dial 4, a touchpad 6, or a keyboard 5 is operated except for actuation of the combination of a specific key etc.

[0232] If the icon 301 shown in drawing 58 is operated while displaying the thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7, display-program 54F will display a thumbnail 201 etc. on all of the viewing areas of the screen of LCD7. If the icon 301 shown in drawing 58 is operated while displaying the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, display-program 54F will display a thumbnail 201 etc. on the predetermined range of the viewing

area of the screen of LCD7.

[0233] While displaying the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7 and display-program 54F display that a thumbnail 201 etc. clicks on the icon 311 shown in drawing 59 on the predetermined range of the viewing area of the screen of LCD7, other application programs corresponding to an icon 311 are started.

[0234] Thus, display-program 54F can display a thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, when actuation of an icon 301 or the predetermined key of a keyboard 5 is operated. While displaying the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, corresponding to actuation of an icon 311, display-program 54F can start other application programs directly. By displaying a thumbnail 201 etc. on all of the screens of LCD7, the operation mistake of the user of operating other application programs can be prevented.

[0235] Since the user wishes cooperation with display-program 54F and other application programs in many cases when other application programs corresponding to an icon 311 are started, display-program 54F display a thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7 automatically. A user can operate display-program 54F and other application programs more efficiently.

[0236] Next, the processing which are display-program 54F which CPU51 performs, and reading program 54G is explained.

[0237] Drawing 60 is a flow chart explaining processing of reading of the contents of display-program 54F and reading program 54G. In step S11, reading program 54G read the number of the contents memorized by the memory stick 116 through the memory stick interface 114. Reading program 54G supply the number of the contents memorized by the memory stick 116 to display-program 54F.

[0238] In step S12, reading program 54G read the contents memorized by the memory stick 116 one by one through the memory stick interface 114, and supply the contents which reading ended to display-program 54F. Processing of reading of the contents from a memory stick 116 by reading program 54G is performed in parallel to the following processings.

[0239] In step S13, the processing manager 151 of display-program 54F asks for the number of the contents which reading program 54G read based on the data supplied from reading program 54G. In step S14, the processing manager 151 of display-program 54F specifies the first contents which reading program 54G read.

[0240] In step S15, the processing manager 151 of display-program 54F computes the location which displays the thumbnail 201 corresponding to contents. In step S16, the contents manipulation routine 152 of display-program 54F generates a thumbnail 201 corresponding to the read contents. In step S17, the contents manipulation routine 152 of display-program 54F displays a thumbnail 201 on the location which the processing manager 151 computed. The contents manipulation routine 152 does not display a thumbnail 201, when the location which displays a thumbnail 201 is out of the viewing area of LCD7.

[0241] In step S18, it judges whether display-program 54F generated the thumbnail 201 corresponding to all the contents that reading ended, and when judged with not generating the thumbnail 201 corresponding to all contents, it progresses to step S19 and the processing manager 151 of display-program 54F specifies the following contents which reading program 54G read.

[0242] In step S20, based on the data supplied from reading program 54G, reading program 54G ask for the number of the contents which reading ended, and the processing manager 151 of display-program 54F repeats processing of generation of return and a thumbnail 201 to step S15.

[0243] When judged with having generated the thumbnail 201 corresponding to all the contents that reading ended in step S18, it progresses to step S21, it judges whether display-program 54F read all the contents memorized by the memory stick 116, and when judged with having read no contents memorized by the memory stick 116, processing is repeated from reading of return and contents to step S12.

[0244] In step S21, since the thumbnail 201 was generated and the predetermined thumbnail 201 was generated to all the contents memorized by the memory stick 116 when judged with having read all the contents memorized by the memory stick 116, processing is ended.

[0245] Thus, display-program 54F and reading program 54G can be made to be able to respond to the contents which read contents and were read one by one from a memory stick 116, can make a thumbnail 201 able to generate, and can be displayed on LCD7.

[0246] Next, processing of a display of the voice data based on display-program 54F is explained with reference to the flow chart of drawing 61. In step S31, display-program 54F make the thumbnail 201 of predetermined magnitude correspond to the magnitude of voice data, and are divided into a predetermined number of fields. When voice data is large, display-program 54F make [many] the number of division of a thumbnail 201, and when voice data is small, they lessen the number of division of a thumbnail 201.

[0247] In step S32, display-program 54F extract the data of the predetermined die length corresponding to the number of division of a thumbnail 201 (the number of fields) from voice data. In step S33, display-program 54F change the extracted data into the data (data of RGB of the same number as the number of fields) of RGB by processing explained with reference to drawing 11. In step S34, display-program 54F set each data of RGB as each of the field of the thumbnail 201 generated by division.

[0248] In step S35, display-program 54F process a shading off to a thumbnail 201 (Buller processing). In step S36, display-program 54F overwrite the text which shows the attribute corresponding to voice data to the position of a thumbnail 201, and processing is ended.

[0249] Thus, display-program 54F can generate the thumbnail 201 of the audio data corresponding to the size of voice data. Display-program 54F are the same processing, and generate the thumbnail 201 corresponding to data, such as a text.

[0250] Next, processing of a display of the Rhine view by display-program 54F is explained with reference to the flow chart of drawing 62. In step S51, display-program 54F determine the number of shafts 221. For example, display-program 54F set the number of shafts 221 to 1, when displaying only a thumbnail 201, and when displaying a thumbnail 201 and a text 211, they set the number of shafts 221 to 2.

[0251] In step S52, display-program 54F determine the sense of a shaft 221 based on a formula (1) or a formula (2). In step S53, display-program 54F determine the display position of a thumbnail 201 based on a shaft 221.

[0252] In step S54, when it judges whether the text 211 corresponding to contents is displayed and is judged with displaying the text 211 corresponding to contents, display-program 54F progress to step S55, and opt for arrangement of a text 211 based on a shaft 221. In step S56, display-program 54F display a text 211 on the location determined by processing of step S55, and go to it at step S57.

[0253] In step S54, since the processing which displays a text 211 is unnecessary when judged with not displaying the text 211 corresponding to contents, processing of step S55 and step S56 is skipped, and procedure progresses to step S57.

[0254] In step S57, display-program 54F display a thumbnail 201 on the location determined by processing of step S53, and

repeat processing of return and a display to step S52.

[0255] As mentioned above, display-program 54F display a thumbnail 201 and a text 211 based on the shaft 221 opened [curve / the straight line or].

[0256] Next, processing of a display of the loop-formation view by display-program 54F is explained with reference to the flow chart of drawing 63. In step S71, display-program 54F determine the number of shafts 241. For example, display-program 54F set the number of shafts 241 to 1, when displaying only a thumbnail 201, and when displaying a thumbnail 201 and a text 211, they set the number of shafts 241 to 2.

[0257] In step S72, display-program 54F determine the form of a shaft 241. In step S73, display-program 54F determine the display position of a thumbnail 201 by the formula (6) based on a shaft 241.

[0258] In step S74, when it judges whether the text 211 corresponding to contents is displayed and is judged with displaying the text 211 corresponding to contents, display-program 54F progress to step S75, and opt for arrangement of a text 211 based on a shaft 241. In step S76, display-program 54F display a text 211 on the location determined by processing of step S75, and go to it at step S77.

[0259] In step S74, since the processing which displays a text 211 is unnecessary when judged with not displaying the text 211 corresponding to contents, processing of step S75 and step S76 is skipped, and procedure progresses to step S77.

[0260] In step S77, display-program 54F display a thumbnail 201 on the location determined by processing of step S73, and repeat processing of return and a display to step S73.

[0261] As mentioned above, display-program 54F display a thumbnail 201 and a text 211 based on the shaft 241 closed [ellipse / the circle or].

[0262] Next, processing of a display of the spiral view by display-program 54F is explained with reference to the flow chart of drawing 64. In step S91, display-program 54F determine the number of shafts 261. For example, display-program 54F set the number of shafts 261 to 1, when displaying only a thumbnail 201, and when displaying a thumbnail 201 and a text 211, they set the number of shafts 261 to 2.

[0263] In step S92, when the jog dial 4, a keyboard 5, or a touchpad 6 is operated, it judges whether selection of a thumbnail 201 is inputted and it is judged with selection of a thumbnail 201 not being inputted, display-program 54F progress to step S93, set a spiral with a large radius r as a shaft 261, and progress to step S95.

[0264] In step S92, when judged with selection of a thumbnail 201 being inputted, it progresses to step S94, and corresponding to the frequency of the input of per unit time amount of selection, display-program 54F set the smaller spiral of a radius r as a shaft 261, and progress to step S95.

[0265] In step S95, display-program 54F determine the display position of a thumbnail 201 by the formula (11), the formula (12), and the formula (13) based on a shaft 261.

[0266] In step S96, when it judges whether the text 211 corresponding to contents is displayed and is judged with displaying the text 211 corresponding to contents, display-program 54F progress to step S97, and opt for arrangement of a text 211 based on a shaft 261. In step S98, display-program 54F display a text 211 on the location determined by processing of step S97, and go to it at step S99.

[0267] In step S96, since the processing which displays a text 211 is unnecessary when judged with not displaying the text 211 corresponding to contents, processing of step S97 and step S98 is skipped, and procedure progresses to step S99.

[0268] In step S99, display-program 54F display a thumbnail 201 on the location determined by processing of step S95, and repeat processing of return and a display to step S92.

[0269] Thus, display-program 54F display a thumbnail 201 and a text 211 based on the spiral shaft 261. When judged with selection of a thumbnail 201 being inputted, display-program 54F display a thumbnail 201 and a text 211 based on the shaft 261 of the spiral of the small radius r .

[0270] Next, processing of migration of the icon 202 by display-program 54F is explained with reference to the flow chart of drawing 65. In step S111, when it judges whether it clicked on one of the icons 202 based on the input from a touchpad 6 and is judged with clicking on neither of the icons 202, the processing manager 151 of display-program 54F repeats processing of a judgment until step S111 clicks on the icon 202 of one of return.

[0271] In step S111, when judged with having clicked on one of the icons 202, it progresses to step S112 and the processing manager 151 of display-program 54F computes the final display position of the icon 202 of *****.

[0272] the final display position of each icon 202 which the processing manager 151 of display-program 54F computed by processing of step S112 in step S113 — and the display position of each icon 202 is computed based on the elapsed time after being clicked. In step S114, the icon manipulation routine 152 of display-program 54F displays an icon 202 on the display position computed by processing of step S113.

[0273] Processing of a display of the icon 202 in step S114 is performed with the period set up by the processing manager 151. By choosing the period of processing of a display of an icon 202 suitably, an icon 202 is displayed to move.

[0274] In step S115, the processing manager 151 of display-program 54F repeats processing of a display of return and an icon to step S113, when it judges whether each icon 202 was displayed on the final display position and judges that it is not displayed on a final display position by each icon 202.

[0275] In step S115, when judged with each icon 202 having been displayed on the final display position, processing is repeated from processing of a judgment of whether step S111 clicked on return and an icon 202.

[0276] Thus, when it clicks on an icon 202, display-program 54F are a predetermined rate, and can make it display that an icon 202 moves.

[0277] Next, processing of a display of the after-image by display-program 54F is explained with reference to the flow chart of drawing 66. In step S131, display-program 54F lower the lightness of the image already displayed, and draw (to for example, 80%).

[0278] In step S132, a new image is overwritten at the image which drew by processing of step S131, it draws, and display-program 54F repeat processing of return and drawing to step S131.

[0279] Thus, since display-program 54F draw so that the lightness of the image which already drew may fall gradually, and they overwrite a new image, they can display an after-image simply.

[0280] Next, processing of the state transition by display-program 54F is explained with reference to the flow chart of drawing 67. In step S151, display-program 54F record the condition of origin which changes, such as the present thumbnail 201 or a display position of an icon 202. In step S152, display-program 54F determine the condition of the points which change, such as a display position of a thumbnail 201 or the migration place of an icon 202.

[0281] In step S153, display-program 54F search for the significance of transition. For example, the significance of transition is beforehand defined for every transition, and is memorized by display-program 54F. In step S154, display-program 54F determine a transition function based on the significance of transition. For example, when the significance of transition is large, display-program 54F choose the transition function which makes a condition change slowly, and when the significance of transition is small, they choose the transition function which makes a condition change quickly.

[0282] In step S155, display-program 54F compute the following condition based on a transition function corresponding to elapsed time. In step S156, display-program 54F shift to the condition of having computed by processing of step S155. For example, in step S155, display-program 54F compute the location of the thumbnail 201 and icon 202 corresponding to elapsed time, and display a thumbnail 201 and an icon 202 on the computed location in step S156.

[0283] step S157 — setting — display-program 54F — the jog dial 4, a touchpad 6, or a keyboard 5 — respectively — since — when judged with not changing the condition of the point which judges and changes [whether the condition of the point which changes based on a signal is changed, and], it progresses to step S158.

[0284] In step S157, when judged with changing the condition of the point which changes, it progresses to step S159 and a current condition is set as the condition of the origin which changes. In step S160, display-program 54F determine the condition of the points which change, such as a display position of a thumbnail 201 or the migration place of an icon 202.

[0285] In step S161, display-program 54F search for the significance of new transition. In step S162, display-program 54F determine a transition function based on the significance of new transition.

[0286] When judged with display-program 54F comparing a current condition with the condition of the point which changes, and they judging whether the condition of the point which changes was reached and having not reached the condition of the point which changes in it in step S158, processing is repeated from the processing which computes return and the following condition to step S155.

[0287] In step S158, when judged with having reached the condition of the point which changes, processing is ended.

[0288] As mentioned above, display-program 54F change in the condition of having been required from the condition, when the condition of a display etc. is changed and there is a demand in the middle of transition based on a transition function. Moreover, since display-program 54F choose a transition function based on the significance of transition, in large transition of significance, a condition shifts comparatively slowly so that a user can recognize a state transition certainly, and a condition shifts quickly in small transition of significance.

[0289] Next, processing of the enlarged display by display-program 54F is explained with reference to the flow chart of drawing 68. In step S181, display-program 54F repeat processing of return and a judgment to step S181, when it judges whether the thumbnail 201 was clicked based on the signal from a touchpad 6 and is judged with the thumbnail 201 not being clicked.

[0290] In processing of step S181, when judged with the thumbnail 201 having been clicked, it progresses to step S182 and display-program 54F judge whether the clicked thumbnail 201 is located in the center of a window.

[0291] In step S182, when judged with the clicked thumbnail 201 not being located in the center of a window, it progresses to step S183, and display-program 54F change a display so that the clicked thumbnail 201 may be located in the center of a window, and repeat return and processing to step S181.

[0292] When judged with the clicked thumbnail 201 being located in the center of a window in step S182, it progresses to step S184. Display-program 54F The enlarged display of the clicked thumbnail 201 is carried out (when a thumbnail 201 corresponds to the data of a static image). When it displays in original magnitude and corresponds to the data of a dynamic image, a dynamic image is generated, and when it corresponds to audio data, return and processing are repeated to step S181 which reproduces voice.

[0293] Thus, when a thumbnail 201 is clicked, since display-program 54F are displayed in the center or carry out the enlarged display of the clicked thumbnail 201, a user can know quickly the contents of the data corresponding to a thumbnail 201 and a thumbnail 201 by easy actuation.

[0294] Next, processing of a display of the frame 281 by the contents manipulation routine 15 of display-program 54F is explained with reference to the flow chart of drawing 69. It judges whether the thumbnail 201 as which he is displaying the contents manipulation routine 152 in step S201 is chosen, and when judged with the thumbnail 201 which he is displaying not being chosen, processing of a judgment is repeated until the thumbnail 201 which return and a it are displaying on step S201 is chosen.

[0295] In step S201, when judged with the thumbnail 201 which he is displaying being chosen, it progresses to step S202 and the contents manipulation routine 152 starts the count of elapsed time. Processing of count-up of elapsed time is continued also in activation of the following processings.

[0296] In step S203, the contents manipulation routine 152 determines the function of lightness change which shows an example to drawing 52. In step S204, the contents manipulation routine 152 computes the lightness of a frame 281 based on elapsed time. In step S205, the contents manipulation routine 152 displays the frame 281 of the lightness computed by processing of step S204.

[0297] In step S206, when it judges whether the thumbnail 201 which he is displaying is chosen and is judged with the thumbnail 201 which he is displaying being chosen, the contents manipulation routine 152 progresses to step S204, and repeats processing of a display of a frame 281.

[0298] In step S206, when judged with the thumbnail 201 which he is displaying not being chosen, it progresses to step S207, and the contents manipulation routine 152 eliminates a frame 281, and repeats processing of a display of return and a frame 281 to step S201.

[0299] Thus, display-program 54F can display the frame 281 from which lightness was periodically changed to the thumbnail 201 chosen. Display-program 54F can display the frame 281 from which saturation or a hue was periodically changed to the thumbnail 201 which is the same processing and is chosen.

[0300] Next, processing of a display of the additive-attributes display 291 by the contents manipulation routine 15 of display-program 54F is explained with reference to the flow chart of drawing 70. step S221 — setting — display-program 54F — the jog dial 4, a touchpad 6, or a keyboard 5 — respectively — since — when it judges whether modification of a display was inputted based on the signal supplied and is judged with modification of a display not being inputted, it progresses to step S222 and the contents manipulation routine 152 judges whether the thumbnail 201 which he is displaying is chosen.

[0301] In step S222, the contents manipulation routine 152 judges whether predetermined time amount (for example, for 1 second) passed, after progressing to step S223 and choosing a thumbnail 201, when judged with the thumbnail 201 which he is displaying being chosen.

[0302] In step S223, when judged with predetermined time amount having passed, it progresses to step S224, and the frame and background containing the text corresponding to a thumbnail 201 display the translucent additive-attributes display 291, and the contents manipulation routine 152 repeats return and processing to step S221.

[0303] In step S221, since processing of moving a thumbnail 201 is performed when judged with modification of a display being inputted, it progresses to step S225, and the contents manipulation routine 152 eliminates the additive-attributes display 291 corresponding to a thumbnail 201, and repeats return and processing to step S221.

[0304] In step S222, since it is not necessary to display the additive-attributes display 291 when judged with the thumbnail 201 which he is displaying not being chosen, it progresses to step S225, and the contents manipulation routine 152 eliminates the additive-attributes display 291 corresponding to a thumbnail 201, and repeats return and processing to step S221.

[0305] In step S223, when judged with predetermined time amount having not passed, it progresses to step S225, and the contents manipulation routine 152 eliminates the additive-attributes display 291 corresponding to a thumbnail 201, and repeats return and processing to step S221.

[0306] Thus, since display-program 54F display the additive-attributes display 291 corresponding to the thumbnail 201 chosen after a thumbnail 201 is chosen and predetermined time amount passes, they can make a display change into a high speed, and can be prevented from checking actuation of a user.

[0307] Since the frame and background of the additive-attributes display 291 which display-program 54F display are translucent, a user can check the thumbnail 201 arranged at the additive-attributes display 291 bottom (back side of a screen).

[0308] Next, processing of selection of the 1st display mode which displays a thumbnail 201 etc. on the predetermined field of the screen of LCD7 by display-program 54F, or the 2nd display mode which displays a thumbnail 201 etc. on all of the screens of LCD7 is explained with reference to the flow chart of drawing 71. In step S251, display-program 54F set up the 1st display mode (a thumbnail 201 etc. is displayed on the predetermined field of the screen of LCD7) which displays the frame of a predetermined field.

[0309] In step S252, since display-program 54F make it the 1st display mode whether to have started other application programs when it judges and is judged with other application programs having been started, they do not change a display mode but repeat processing of return and a judgment to step S252.

[0310] the case where it is judged with other application programs not being started in step S252 — step S253 — progressing — display-program 54F — the jog dial 4, a touchpad 6, or a keyboard 5 — respectively — since — it judges whether modification of a display mode was inputted based on the signal supplied.

[0311] In step S253, since it is not necessary to change a display mode when judged with modification of a display mode not being inputted, processing of return and a judgment is repeated to step S252.

[0312] In step S253, when judged with modification of a display mode having been inputted, it progresses to step S254 and display-program 54F set up the 2nd display mode displayed on the whole display screen of LCD7.

[0313] the case where display-program 54F judged whether other application programs were started, and it is judged with other application programs not being started in step S255 — step S256 — progressing — the jog dial 4, a touchpad 6, or a keyboard 5 — respectively — since — it judges whether modification of a display mode was inputted based on the supplied signal.

[0314] In step S256, since it is not necessary to change a display mode when judged with modification of a display mode not being inputted, processing of return and a judgment is repeated to step S255.

[0315] In step S256, when judged with modification of a display mode having been inputted, to step S251, return and display-program 54F are set as the 1st display mode, and repeat processing.

[0316] In step S255, since it changes into the 1st display mode when judged with other application programs having been started, to step S251, return and display-program 54F are set as the 1st display mode, and repeat processing.

[0317] Thus, display-program 54F can be changed to the 1st display mode, when other application programs are started, while changing the 1st display mode and 2nd display mode corresponding to an input.

[0318] Although a series of processings mentioned above can also be performed by hardware, they can also be performed with software. When performing a series of processings with software, the program which constitutes the software is installed in a general-purpose personal computer etc. from a program storing medium possible [performing various kinds of functions] by installing the computer built into the hardware of dedication, or various kinds of programs.

[0319] The program storing medium which stores the program which is installed in a computer and made into the condition which can be performed by computer As shown in drawing 5, a magnetic disk 121 (a floppy disk is included), an optical disk 122 (CD-ROM (Compact Disc-Read Only Memory) —) DVD (Digital Versatile Disc) is included. It is constituted by the package media which consist of a magneto-optic disk 123 (MD (Mini-Disc) is included) or semiconductor memory 124 or ROM in which a program is stored temporarily or permanently, HDD67, etc. Storing of the program to a program storing medium is performed through the interface of a router, a modem 75, etc. using the communication media of cables or wireless, such as a Local Area Network, the Internet, and digital satellite broadcasting, if needed.

[0320] In addition, in this specification, even if the processing serially performed in accordance with the sequence that the step which describes the program stored in a program storing medium was indicated is not of course necessarily processed serially, it is a juxtaposition thing also including the processing performed according to an individual.

[0321] Moreover, in this specification, a system expresses the whole equipment constituted by two or more equipments.

[0322]

[Effect of the Invention] According to an information processor according to claim 1, the information processing approach according to claim 3, and the program storing medium according to claim 4 When the display of a thumbnail is controlled, it is judged whether the thumbnail is chosen or not and it is judged with the thumbnail being chosen. Since the display of the frame of a thumbnail was controlled to change a color with the period which a user can recognize, it can know which thumbnail is chosen quickly and certainly.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

- [Drawing 1] It is the perspective view showing the appearance of the gestalt of 1 operation of the personal computer 1 of the note type concerning this invention.
- [Drawing 2] It is the top view of a body 2.
- [Drawing 3] It is the enlarged drawing of the jog dial 4.
- [Drawing 4] It is the side elevation of a personal computer 1.
- [Drawing 5] It is drawing showing the configuration of the gestalt of 1 operation of a personal computer 1.
- [Drawing 6] It is drawing explaining the configuration of display-program 54F and reading program 54G.
- [Drawing 7] It is drawing explaining the screen displayed on LCD7.
- [Drawing 8] It is drawing explaining the screen displayed on LCD7.
- [Drawing 9] It is drawing explaining the screen displayed on LCD7.
- [Drawing 10] It is drawing explaining the thumbnail corresponding to audio data.
- [Drawing 11] It is drawing explaining the procedure which generates the thumbnail which displays the image corresponding to audio data.
- [Drawing 12] It is drawing showing the example of the thumbnail which displays the image corresponding to audio data.
- [Drawing 13] It is drawing showing the example of the thumbnail which displays the image corresponding to the data of a text.
- [Drawing 14] It is drawing explaining arrangement of the conventional thumbnail.
- [Drawing 15] It is drawing explaining the Rhine view.
- [Drawing 16] It is drawing explaining a shaft 221-1 and a shaft 221-2.
- [Drawing 17] It is drawing explaining the Rhine view.
- [Drawing 18] It is drawing explaining a loop-formation view.
- [Drawing 19] It is drawing explaining a loop-formation view.
- [Drawing 20] It is drawing explaining a shaft 241-1 and a shaft 241-2.
- [Drawing 21] It is drawing explaining a spiral view.
- [Drawing 22] It is drawing explaining a spiral view.
- [Drawing 23] It is drawing explaining a shaft 261.
- [Drawing 24] It is drawing explaining a square view.
- [Drawing 25] It is drawing explaining a square view.
- [Drawing 26] It is drawing explaining migration of an icon 202.
- [Drawing 27] It is drawing explaining migration of an icon 202.
- [Drawing 28] It is drawing explaining after-image processing.
- [Drawing 29] It is drawing explaining after-image processing.
- [Drawing 30] It is drawing explaining a state transition.
- [Drawing 31] It is drawing explaining a transition function.
- [Drawing 32] It is drawing explaining a state transition.
- [Drawing 33] It is drawing explaining a state transition.
- [Drawing 34] It is drawing explaining processing of modification of the display position of a thumbnail 201.
- [Drawing 35] It is drawing showing the example of modification of the display position of a thumbnail 201.
- [Drawing 36] It is drawing showing the example of modification of the display position of a thumbnail 201.
- [Drawing 37] It is drawing explaining selection of a thumbnail 201.
- [Drawing 38] It is drawing explaining selection of a thumbnail 201.
- [Drawing 39] It is drawing explaining an enlarged display.
- [Drawing 40] It is drawing explaining selection of a thumbnail 201.
- [Drawing 41] It is drawing explaining selection of a thumbnail 201.
- [Drawing 42] It is drawing explaining an enlarged display.
- [Drawing 43] It is drawing explaining selection of a thumbnail 201.
- [Drawing 44] It is drawing explaining selection of a thumbnail 201.
- [Drawing 45] It is drawing explaining an enlarged display.
- [Drawing 46] It is drawing explaining selection of a thumbnail 201.
- [Drawing 47] It is drawing explaining selection of a thumbnail 201.
- [Drawing 48] It is drawing explaining an enlarged display.
- [Drawing 49] It is drawing explaining significance.
- [Drawing 50] It is drawing explaining the example of the processing corresponding to significance.
- [Drawing 51] It is drawing explaining the display of a frame 281.
- [Drawing 52] It is drawing explaining the example of change of the lightness of a frame 281 corresponding to the passage of time, or saturation.
- [Drawing 53] It is drawing explaining the example of change of the hue of a frame 281 corresponding to the passage of time.
- [Drawing 54] It is drawing explaining processing of a display of the additive-attributes display 291.
- [Drawing 55] It is drawing showing the example of a display of the additive-attributes display 291.

[Drawing 56] It is drawing showing the example of a display which displays a thumbnail 201 etc. on all or some of fields of the screens of LCD7.

[Drawing 57] It is drawing showing the example of a display which displays a thumbnail 201 etc. on all of the screens of LCD7.

[Drawing 58] It is drawing explaining an icon 301.

[Drawing 59] It is drawing explaining an icon 311.

[Drawing 60] It is a flow chart explaining processing of reading of contents.

[Drawing 61] It is a flow chart explaining processing of a display of audio data.

[Drawing 62] It is a flow chart explaining processing of a display of the Rhine view.

[Drawing 63] It is a flow chart explaining processing of a display of a loop-formation view.

[Drawing 64] It is a flow chart explaining processing of a display of a spiral view.

[Drawing 65] It is a flow chart explaining processing of migration of an icon 202.

[Drawing 66] It is a flow chart explaining processing of a display of an after-image.

[Drawing 67] It is a flow chart explaining processing of a state transition.

[Drawing 68] It is a flow chart explaining processing of an enlarged display.

[Drawing 69] It is a flow chart explaining processing of a display of a frame 281.

[Drawing 70] It is a flow chart explaining processing of a display of an attribute.

[Drawing 71] It is a flow chart explaining processing of selection of a display mode.

[Description of Notations]

1 Personal Computer 4 Jog Dial, 5 A keyboard, 6 A touchpad, 51 CPU 54 RAM, 54E OS 54F A display program, 54G Reading program 67 HDD 80 communication networks 121 magnetic disk 122 An optical disk, 123 Magneto-optic disk 124

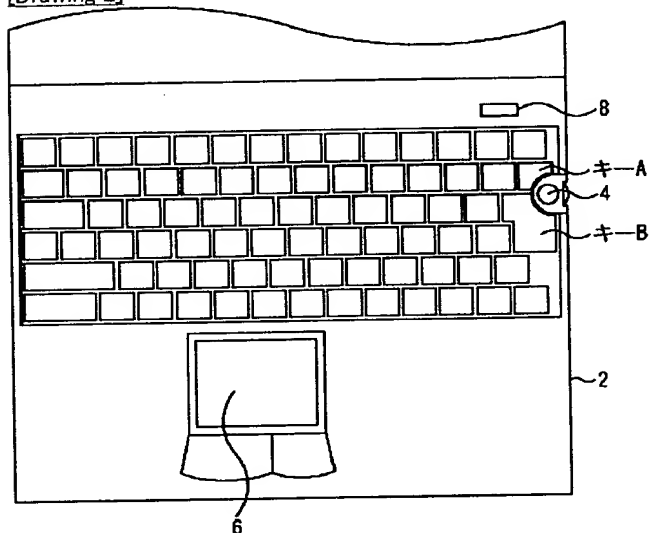
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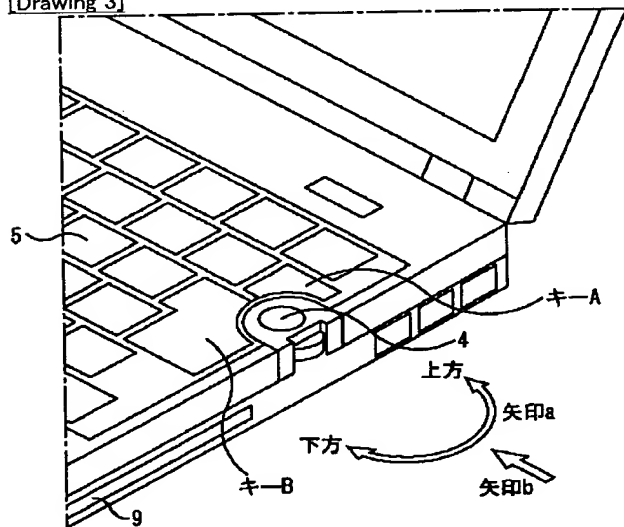
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DRAWINGS

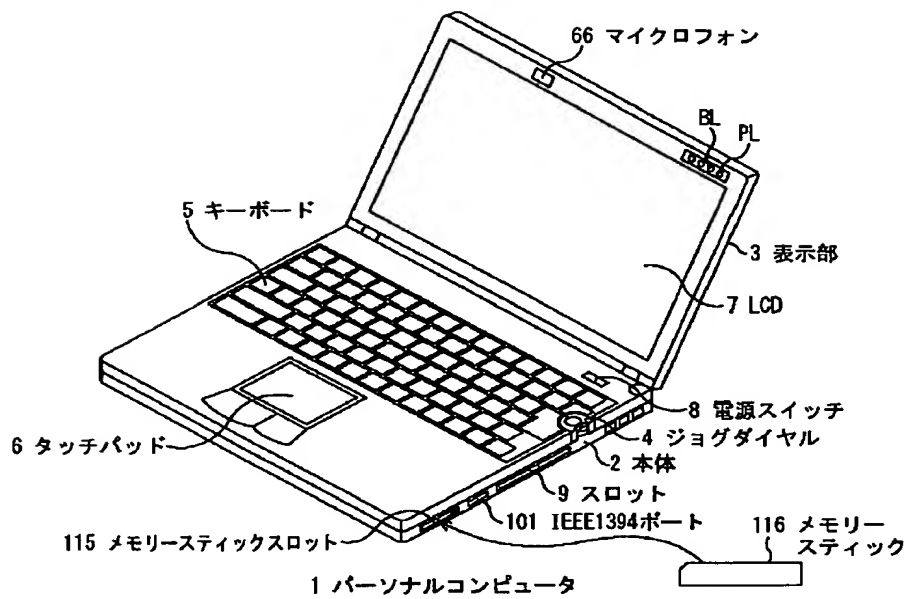
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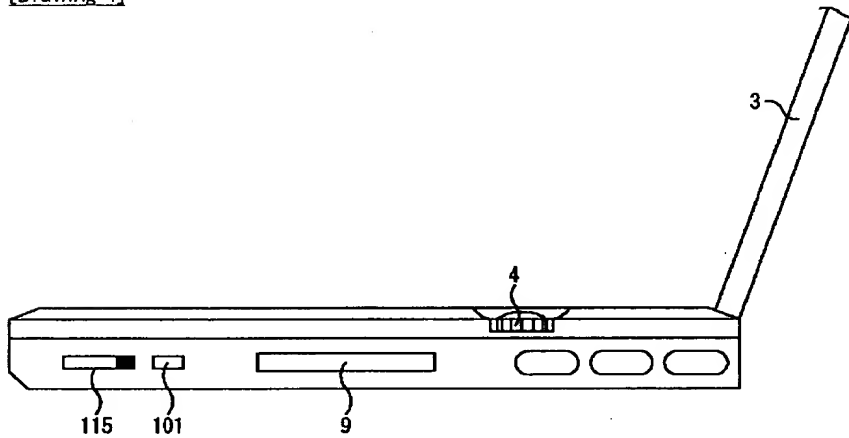
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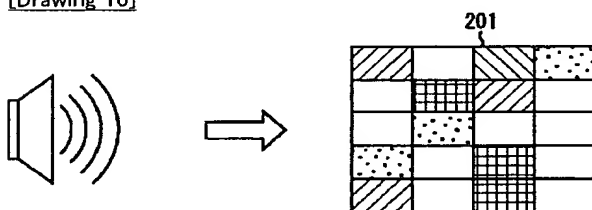
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[Drawing 4]

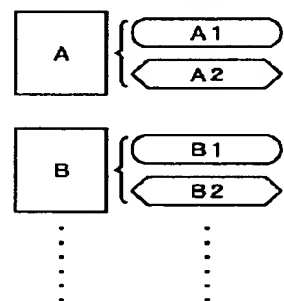


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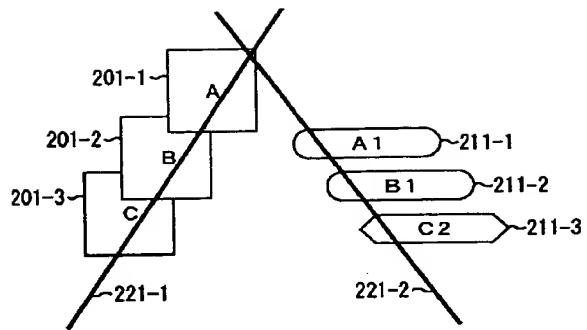


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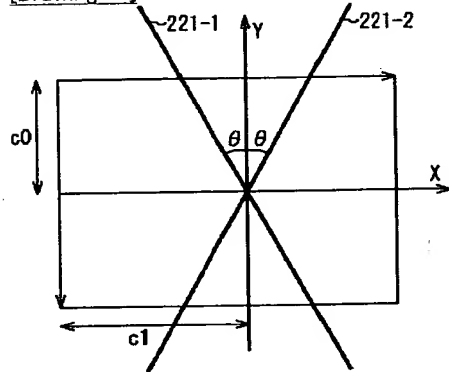
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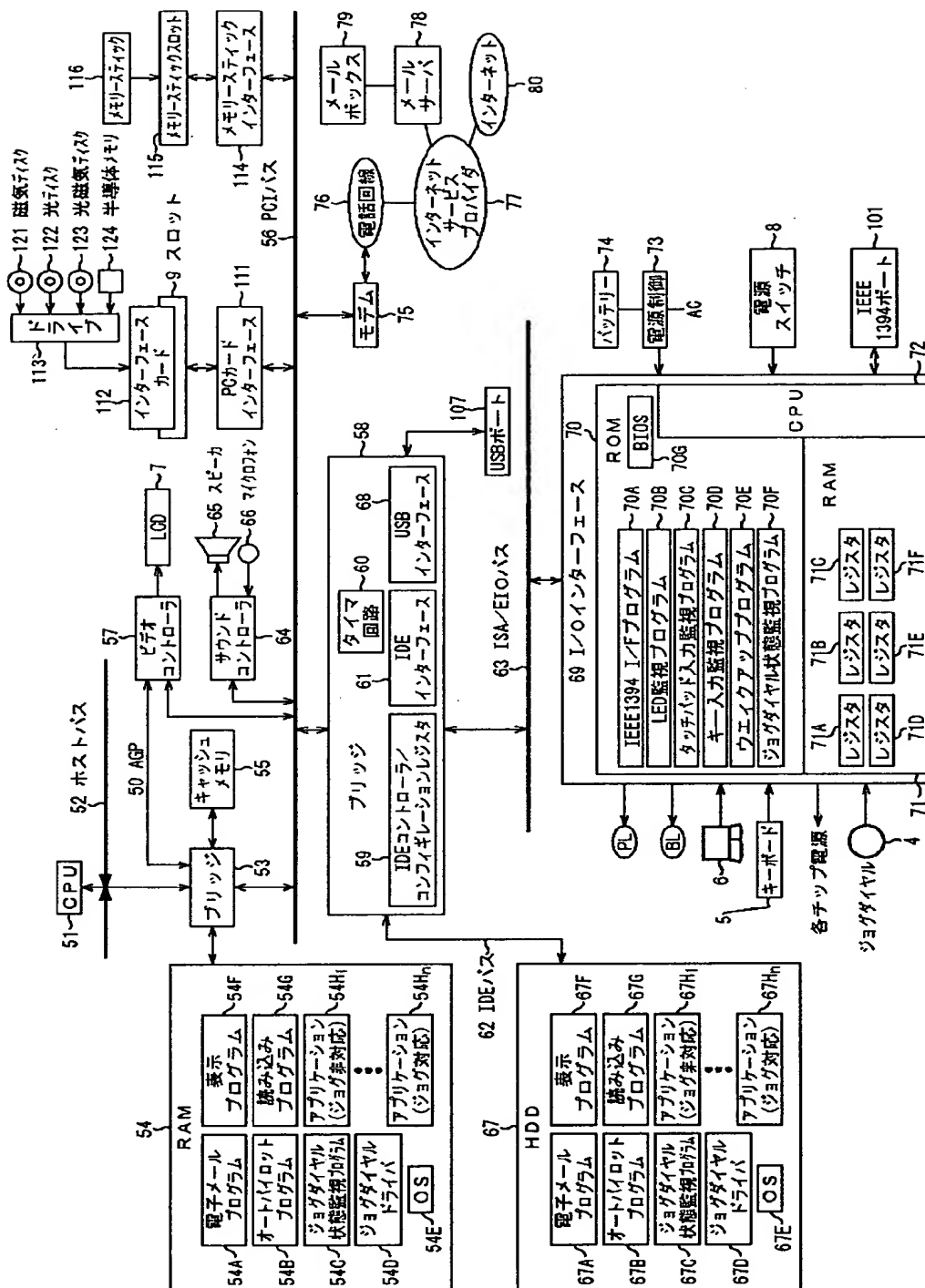
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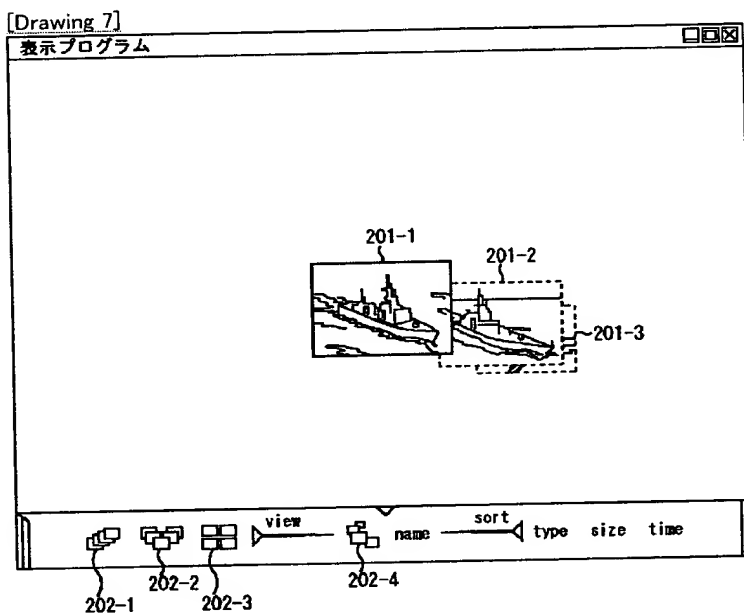
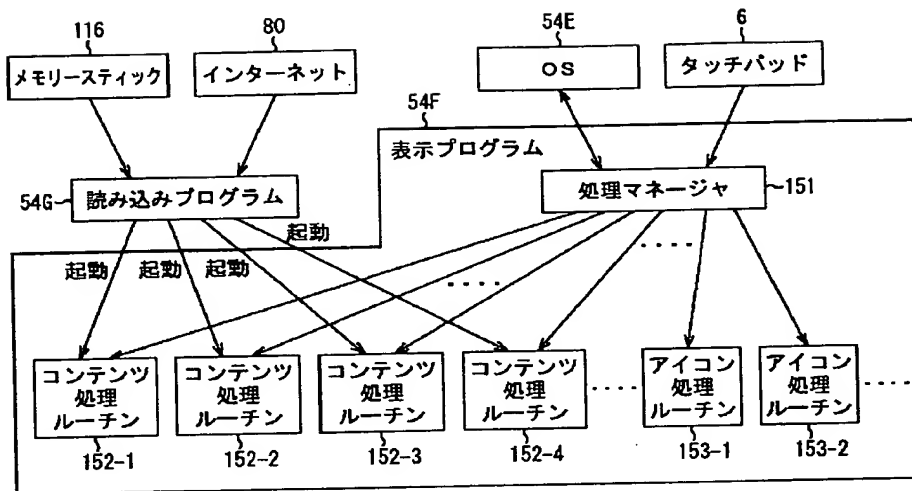
[Drawing 16]



[Drawing 5]



[Drawing 6]



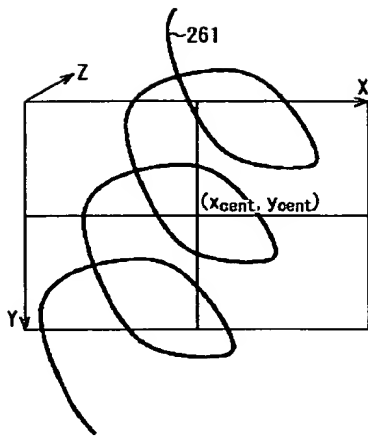
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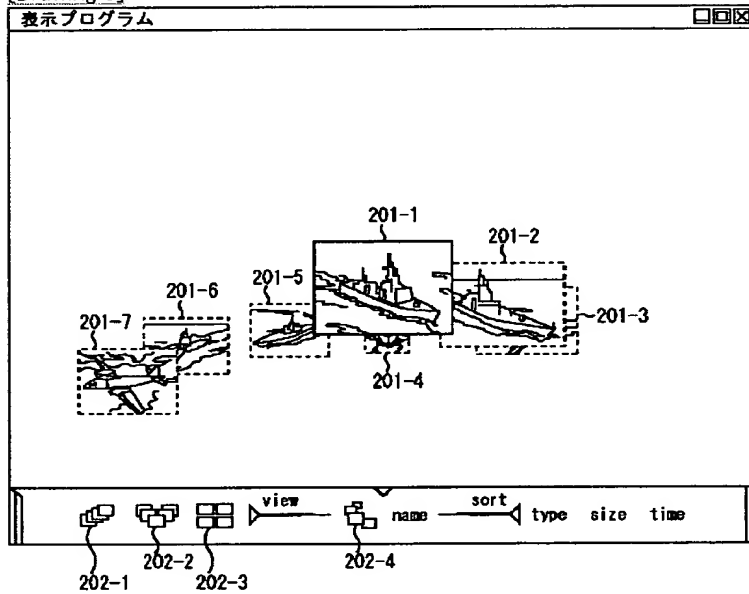
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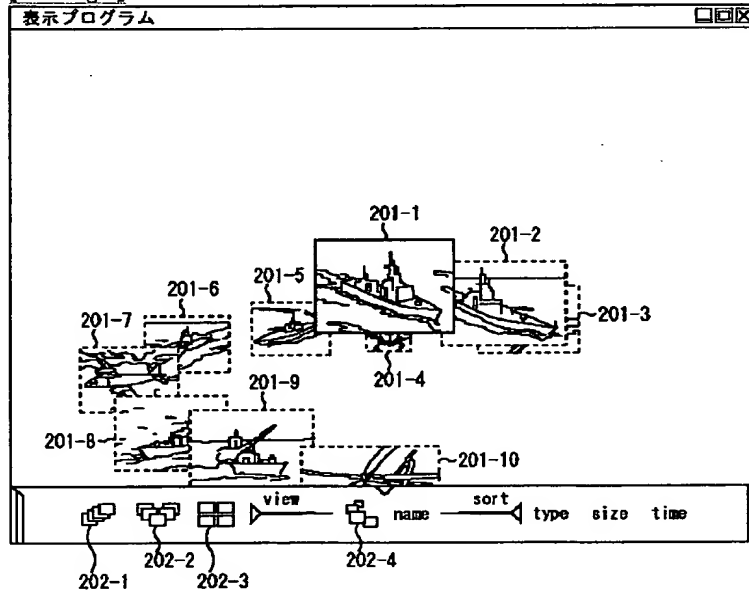
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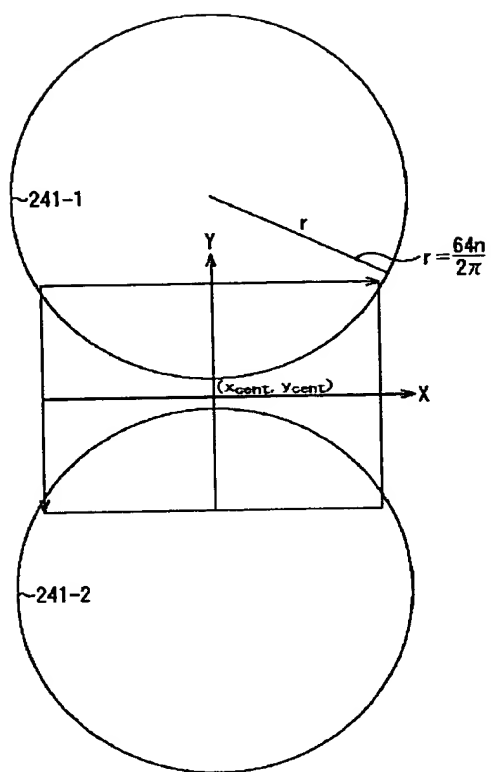
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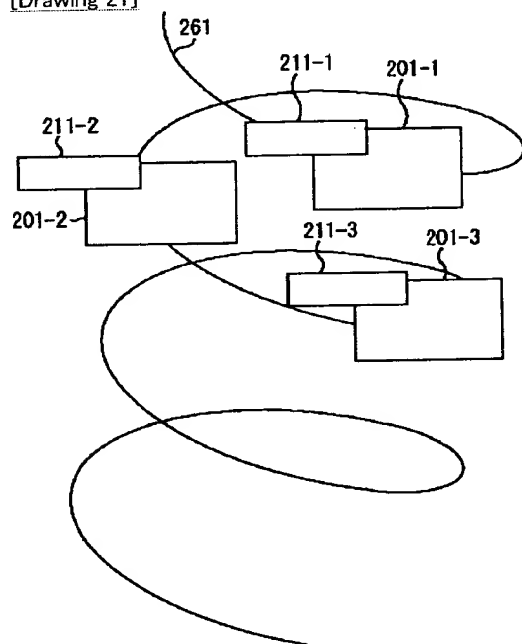
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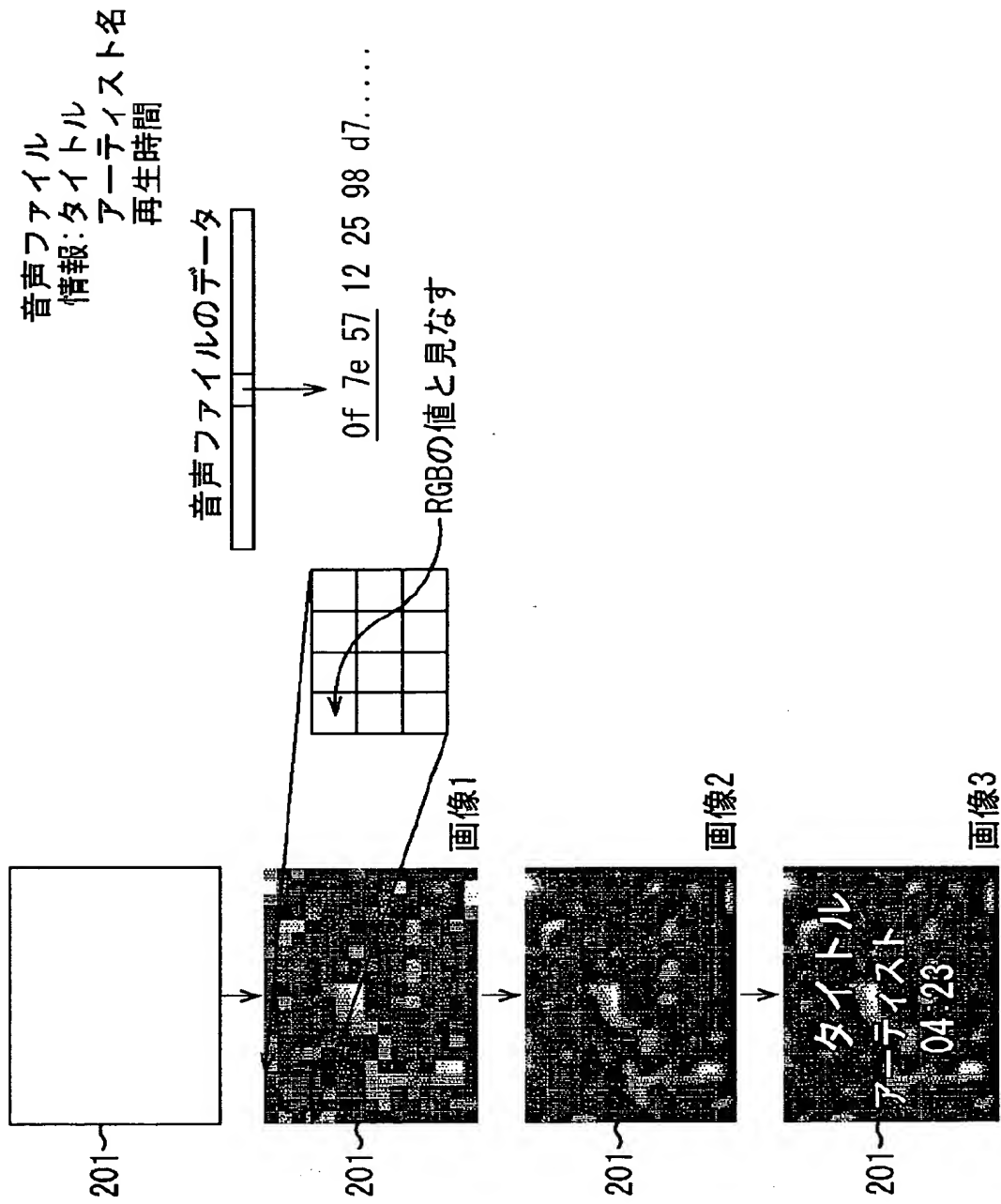
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[Drawing 21]



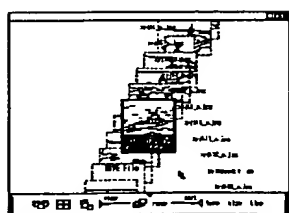
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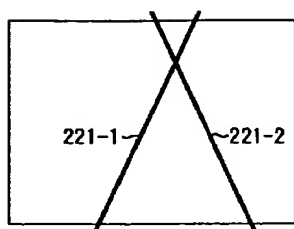
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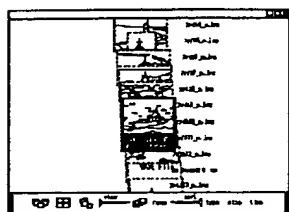
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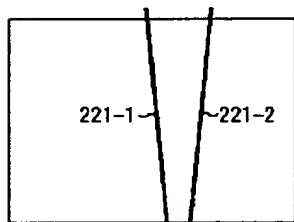
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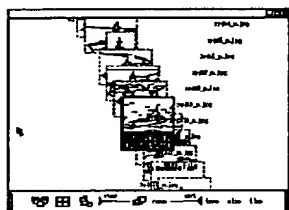
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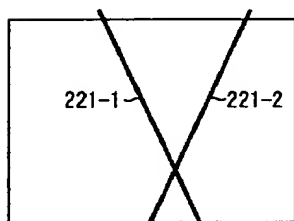
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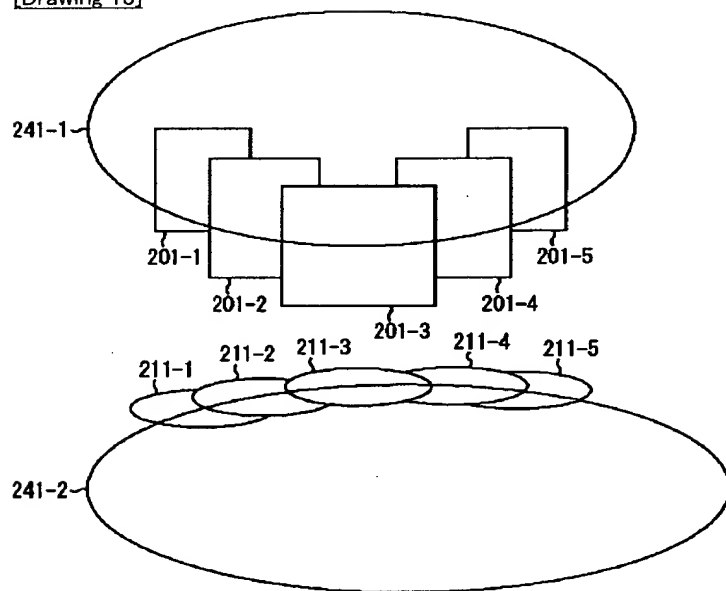


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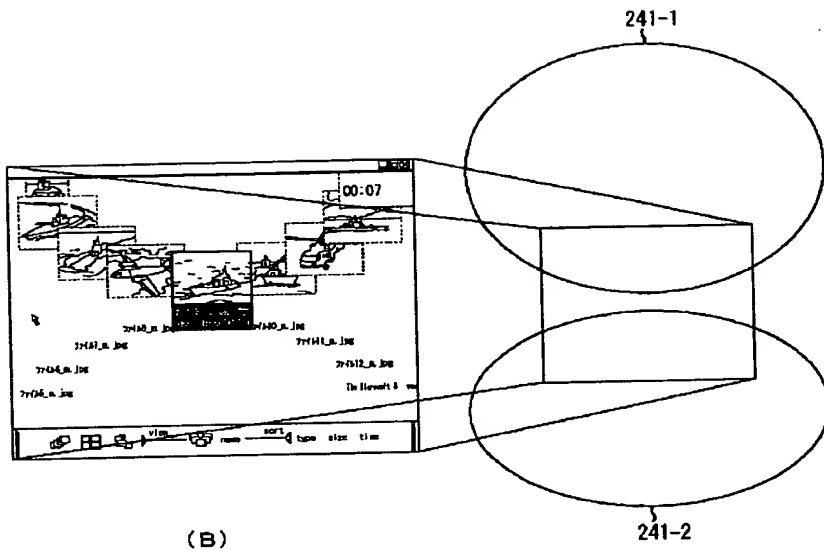


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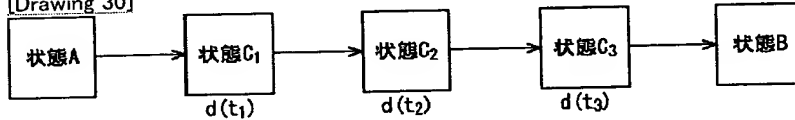
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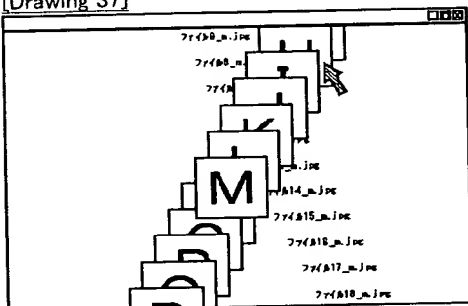
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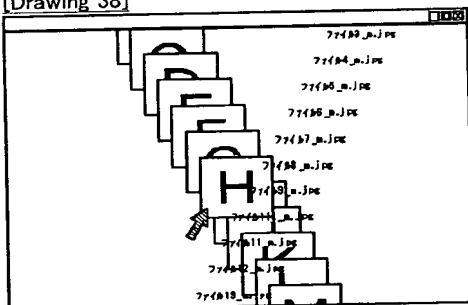
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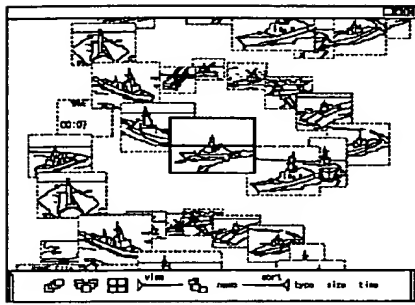
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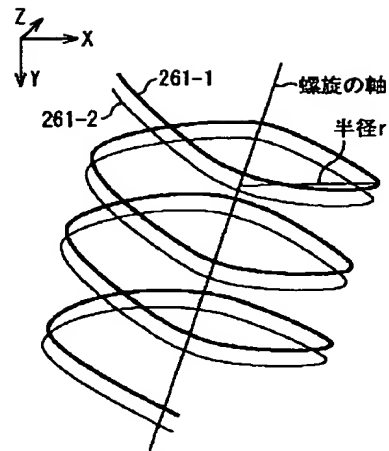
[Drawing 38]



[Drawing 22]

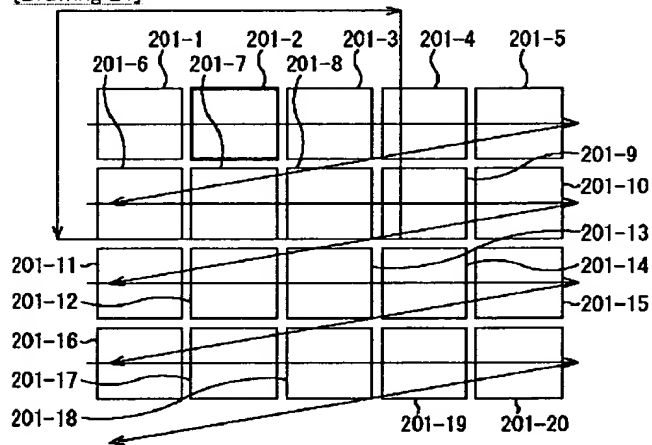


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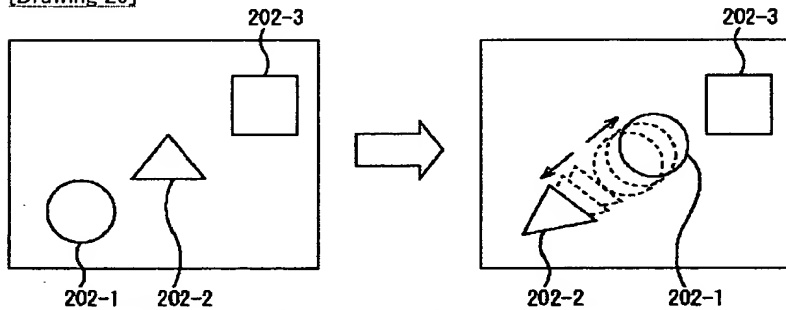


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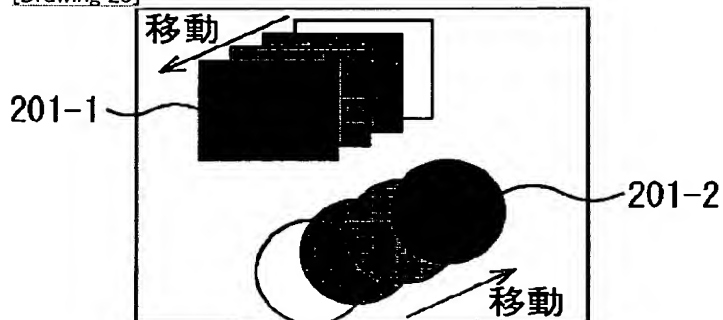
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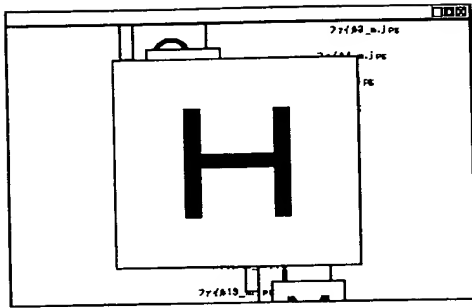
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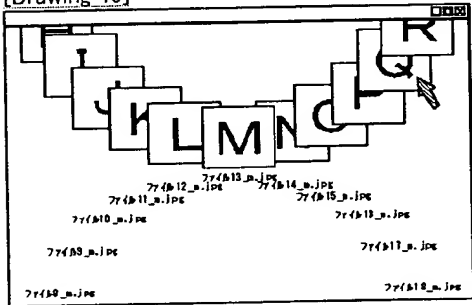
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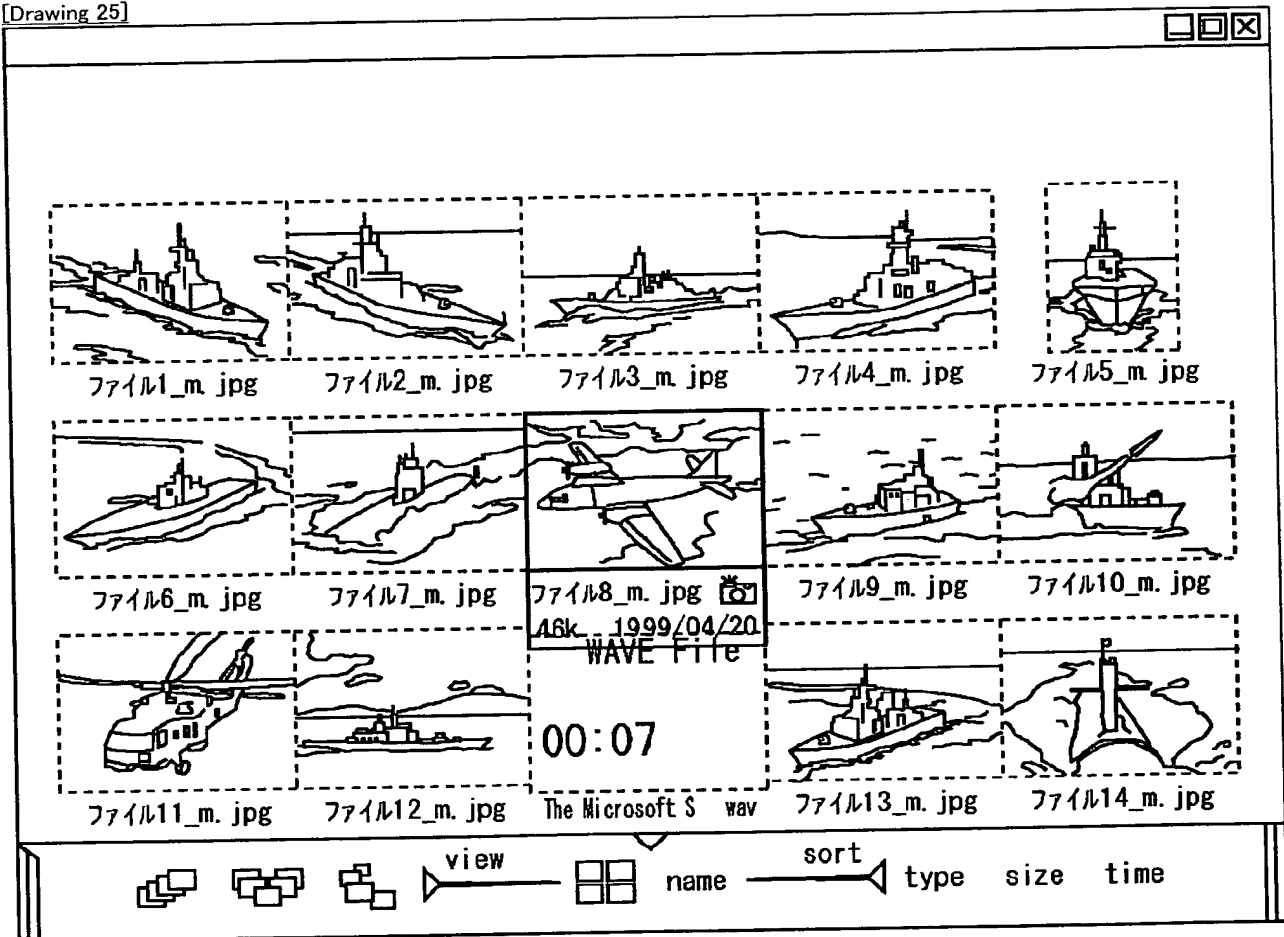
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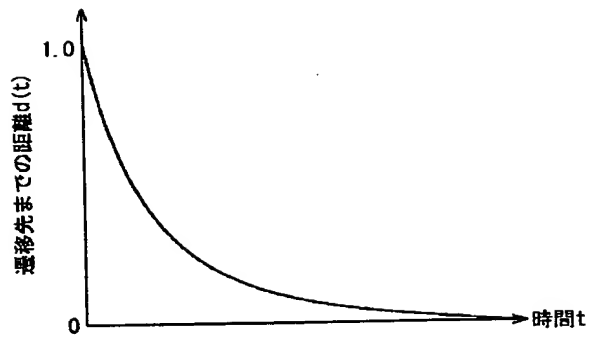
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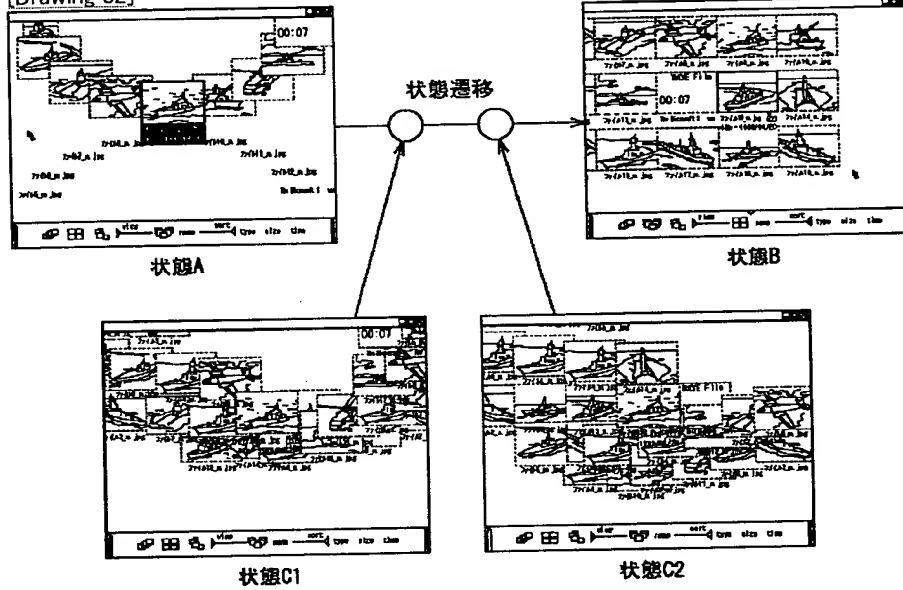
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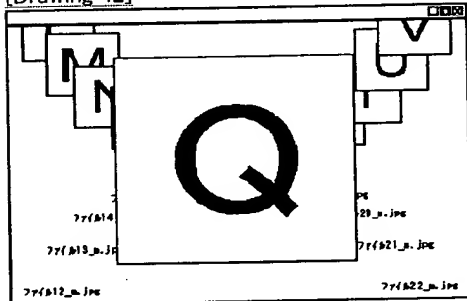
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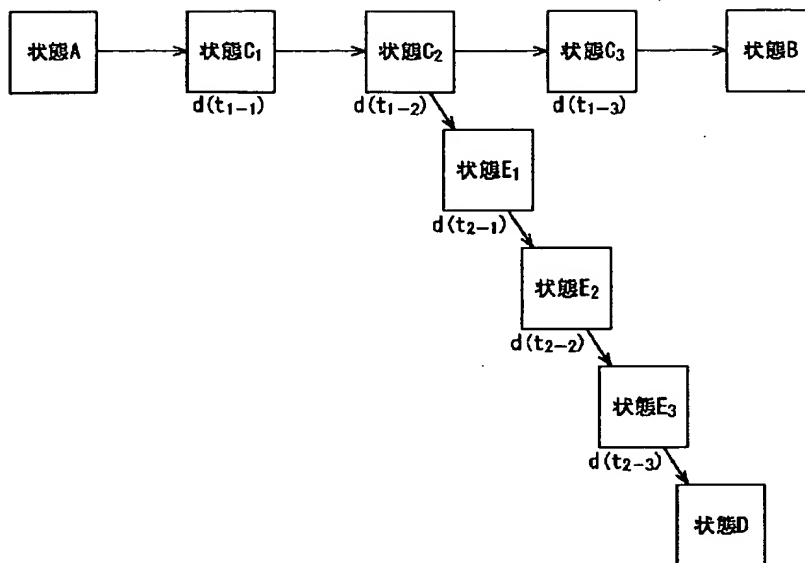
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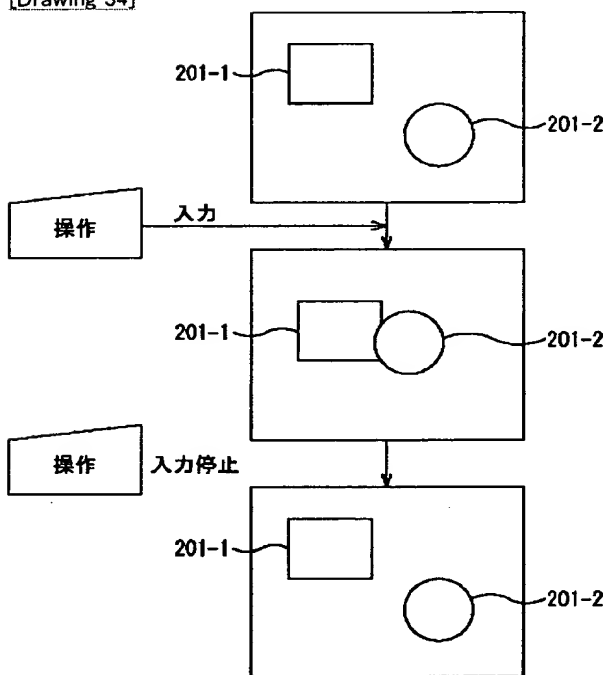
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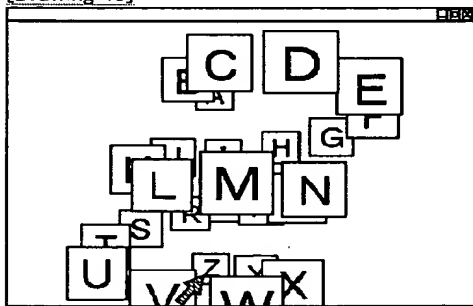
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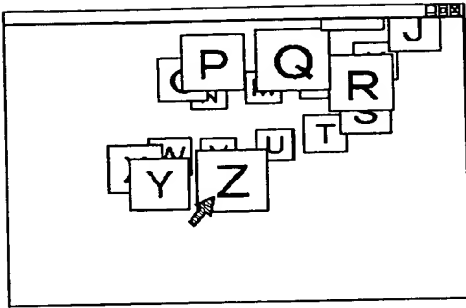
[Drawing 34]



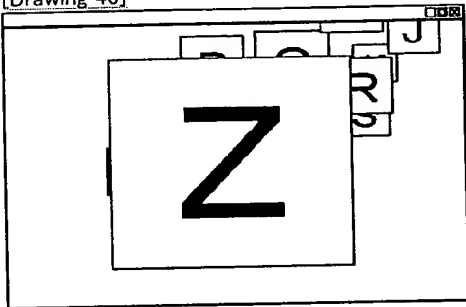
[Drawing 43]



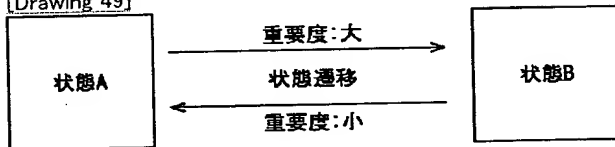
[Drawing 44]



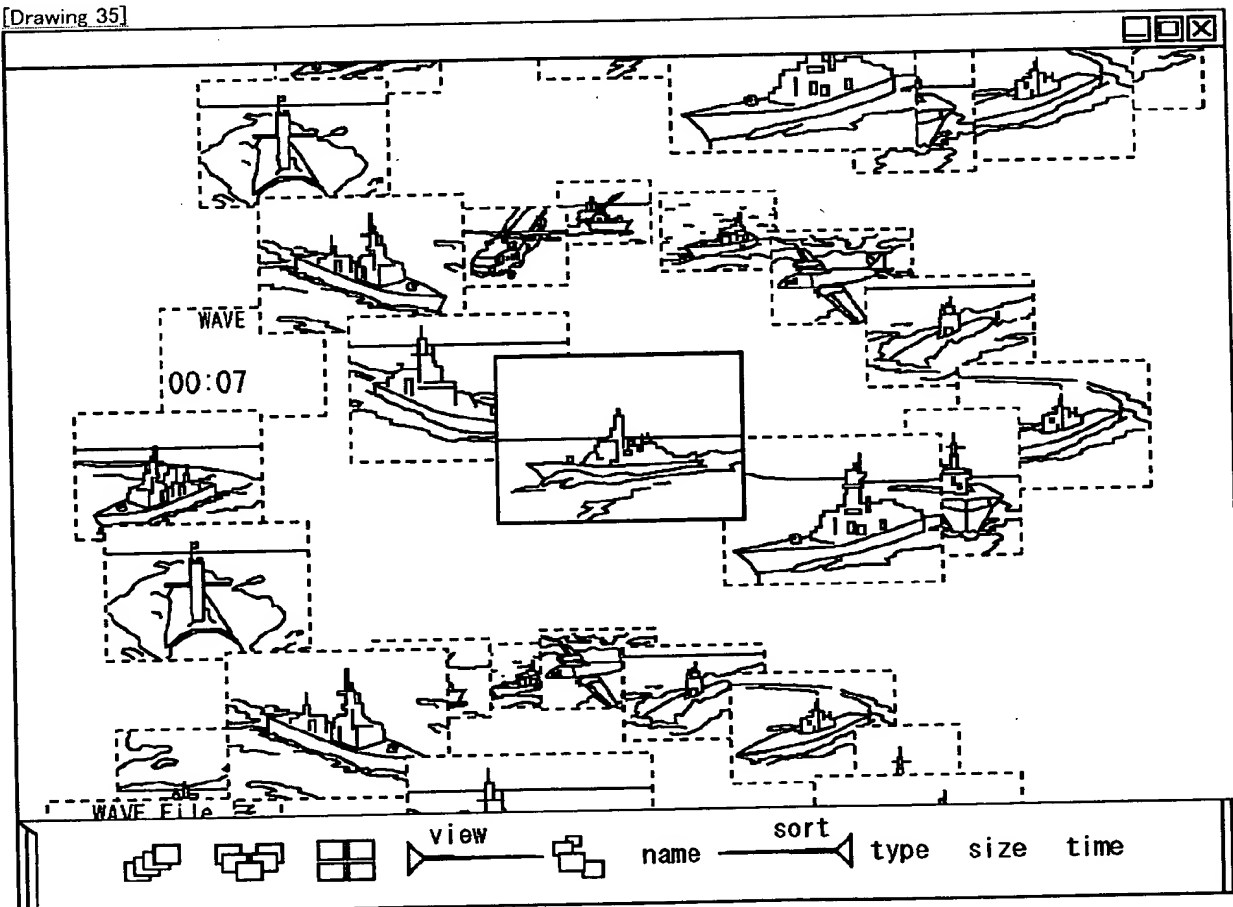
[Drawing 45]



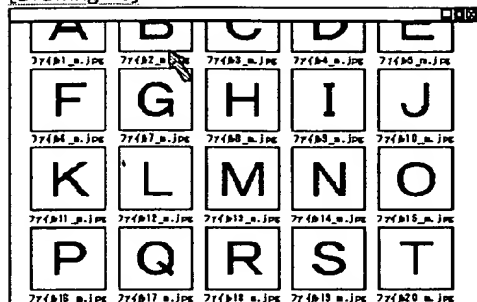
[Drawing 49]



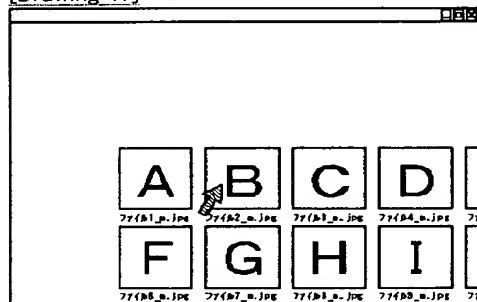
[Drawing 35]



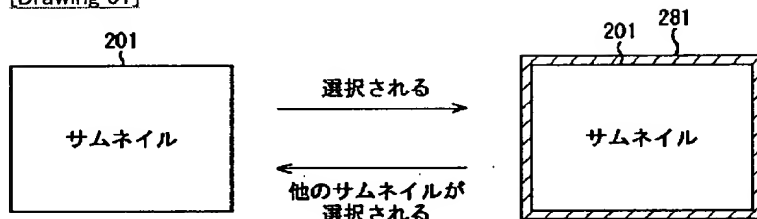
[Drawing 46]



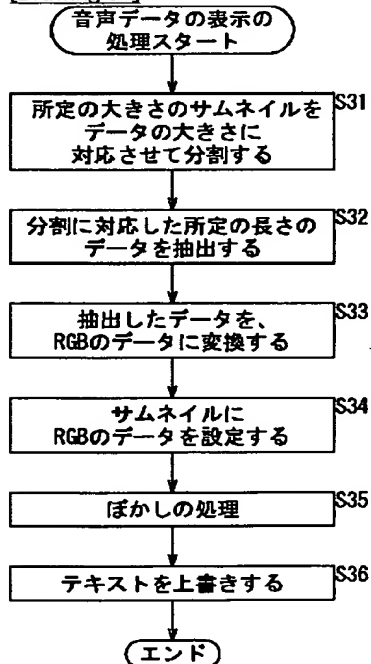
[Drawing 47]



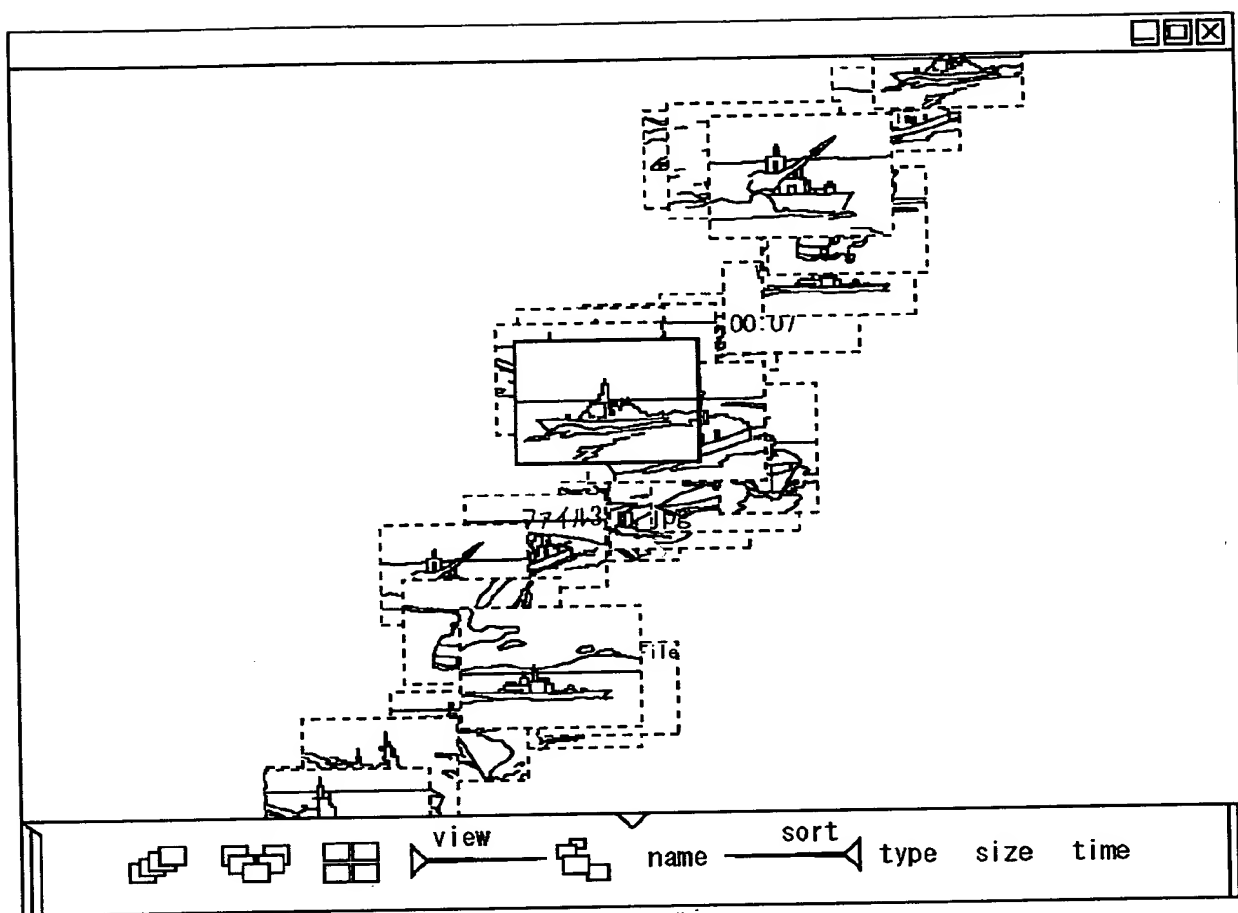
[Drawing 51]



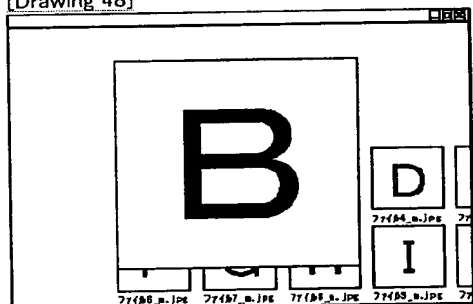
[Drawing 61]



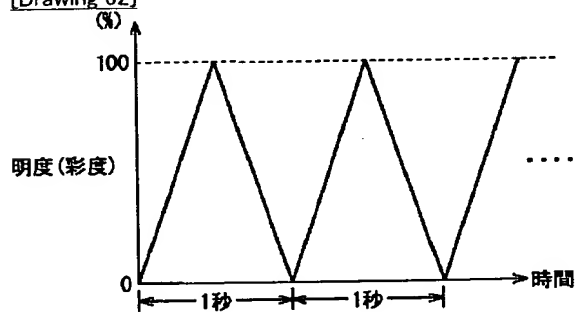
[Drawing 36]



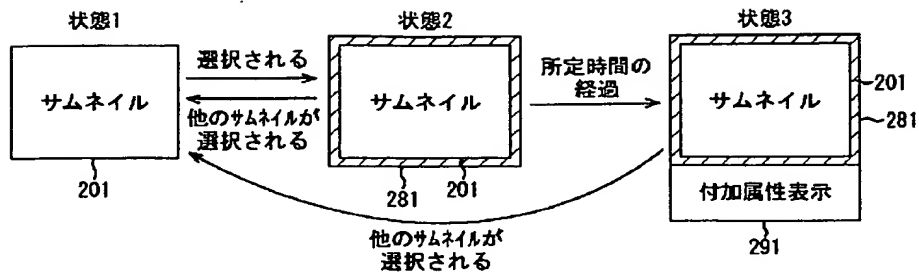
[Drawing 48]



[Drawing 52]

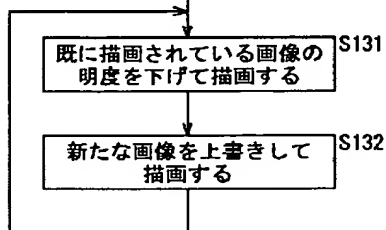


[Drawing 54]

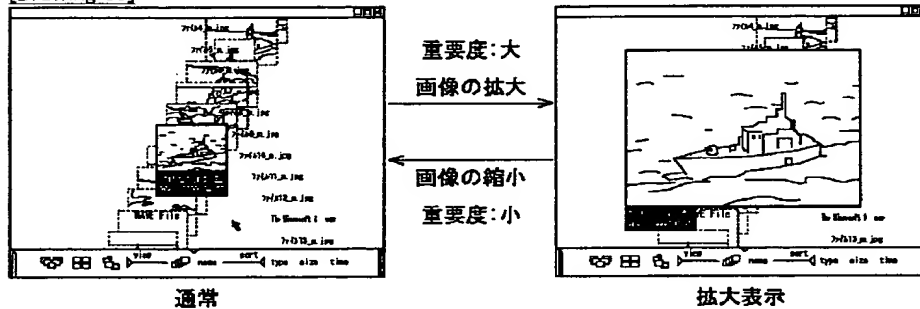


[Drawing 66]

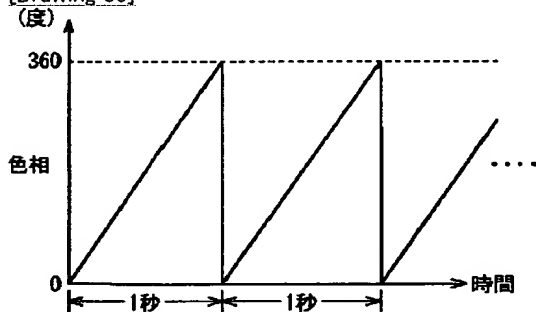
(残像の表示の処理スタート)



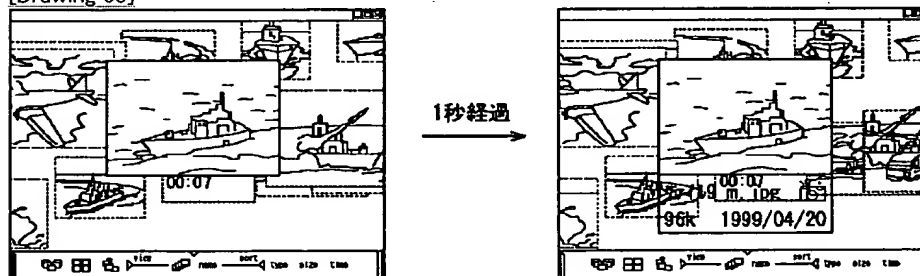
[Drawing 50]



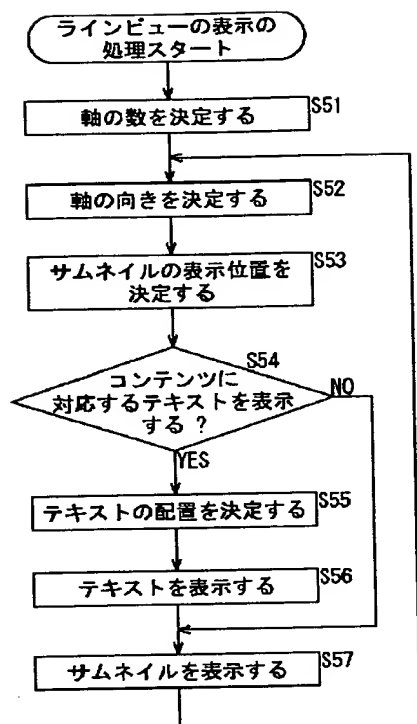
[Drawing 53]



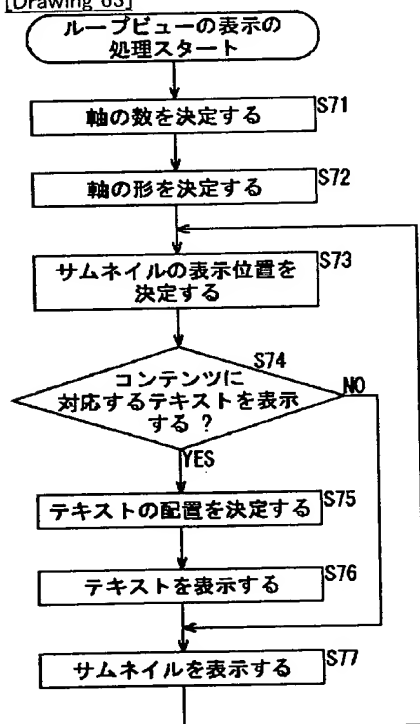
[Drawing 55]



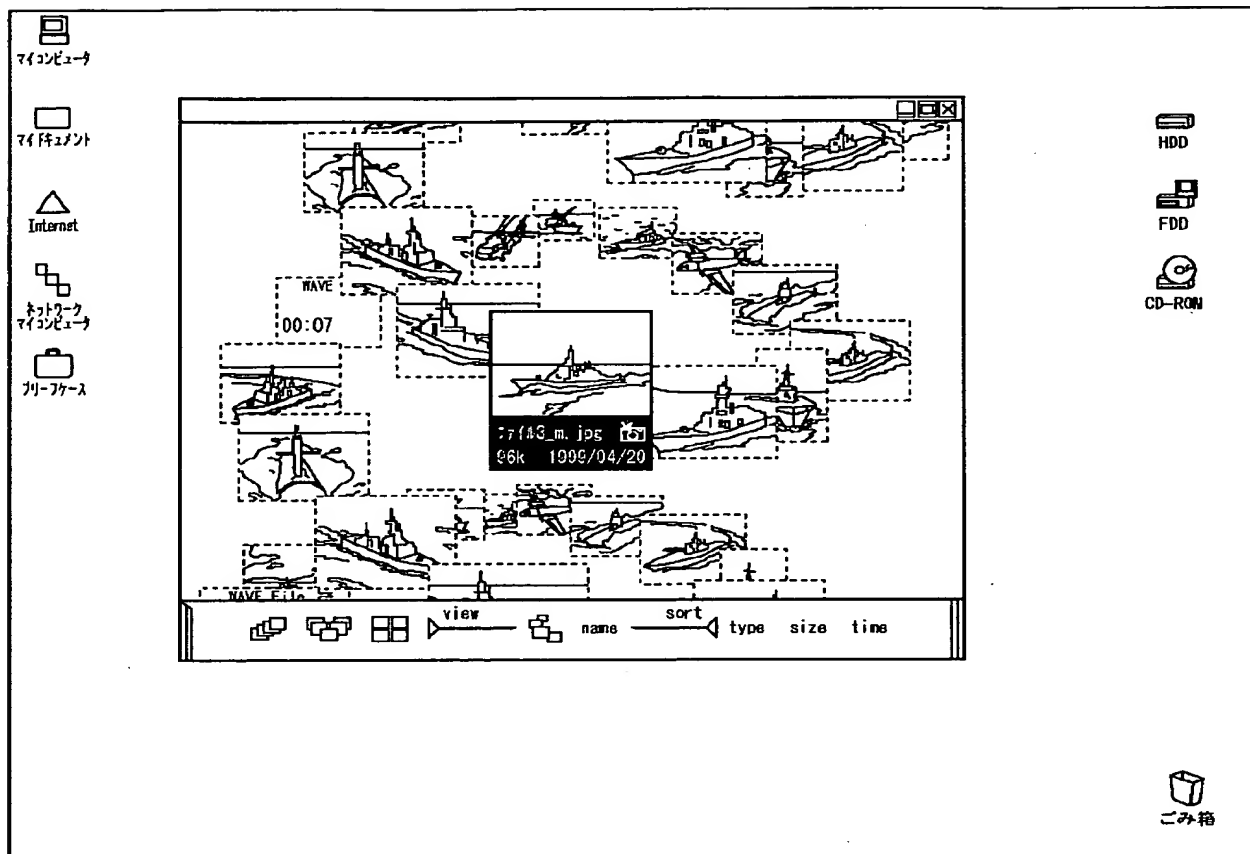
[Drawing 62]



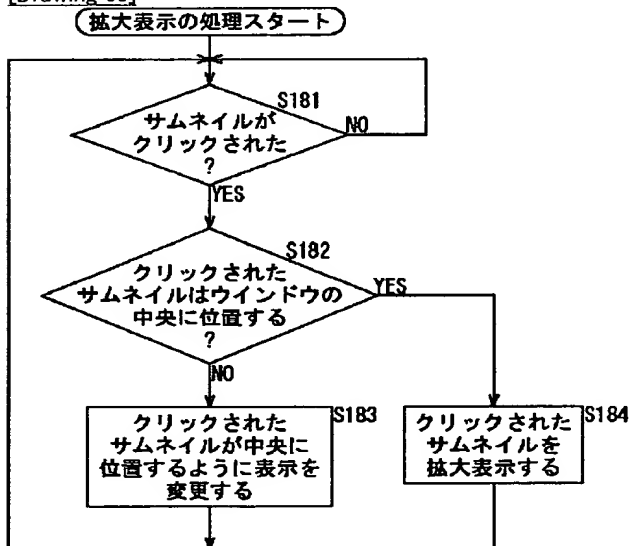
[Drawing 63]



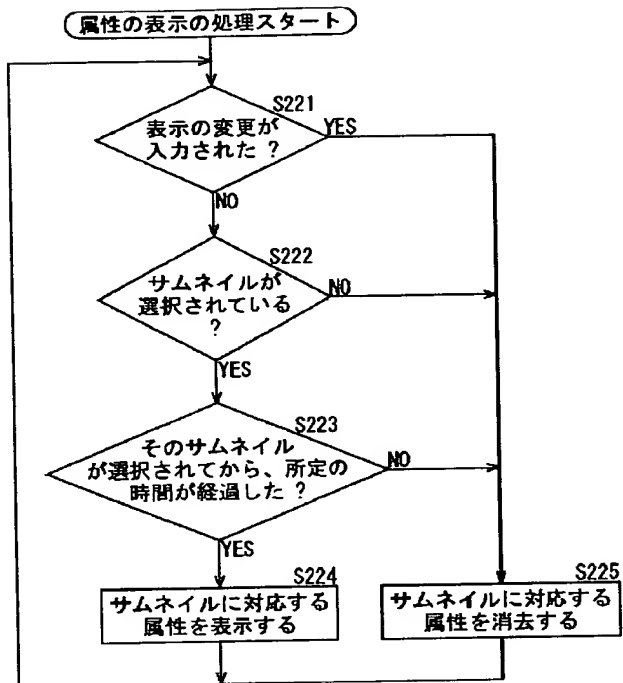
[Drawing 56]



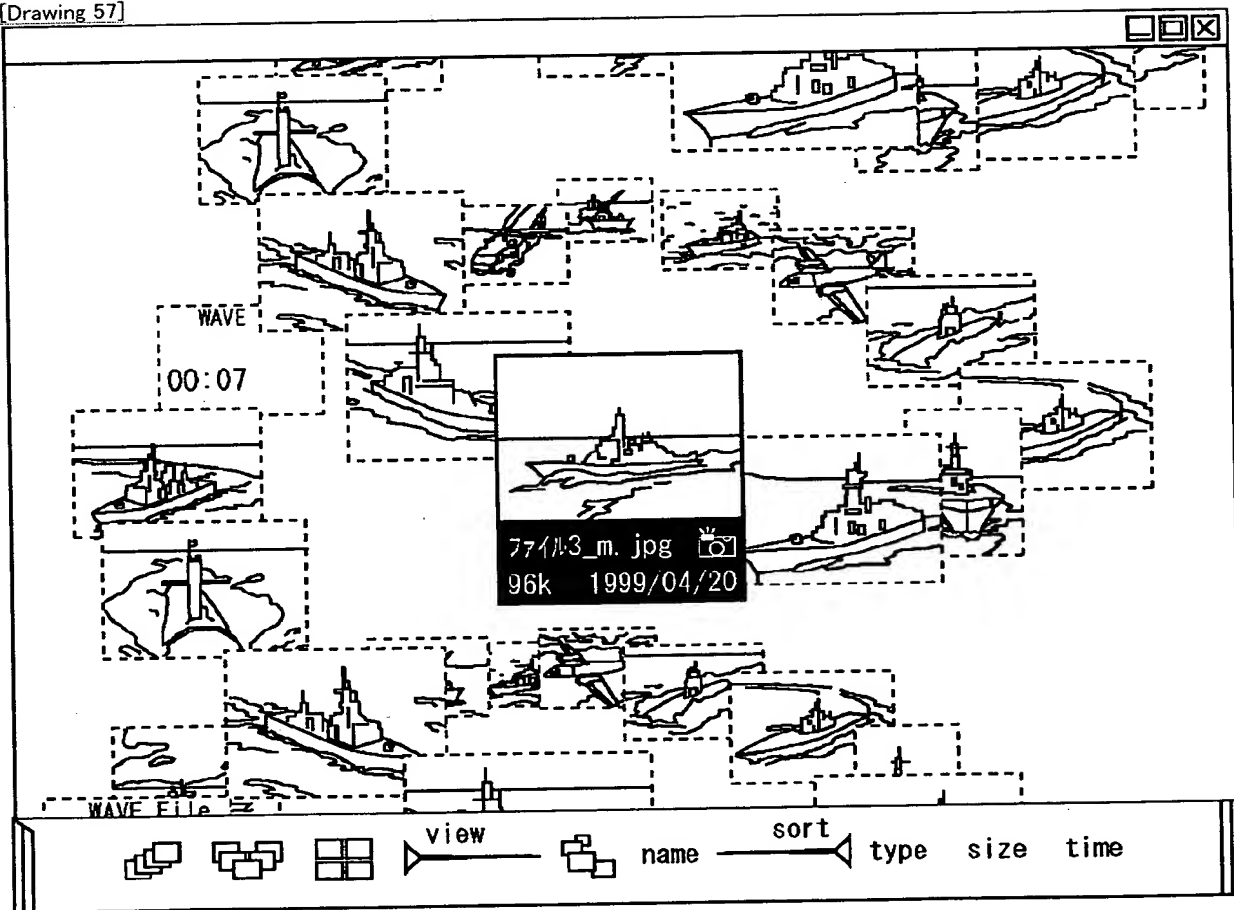
[Drawing 68]



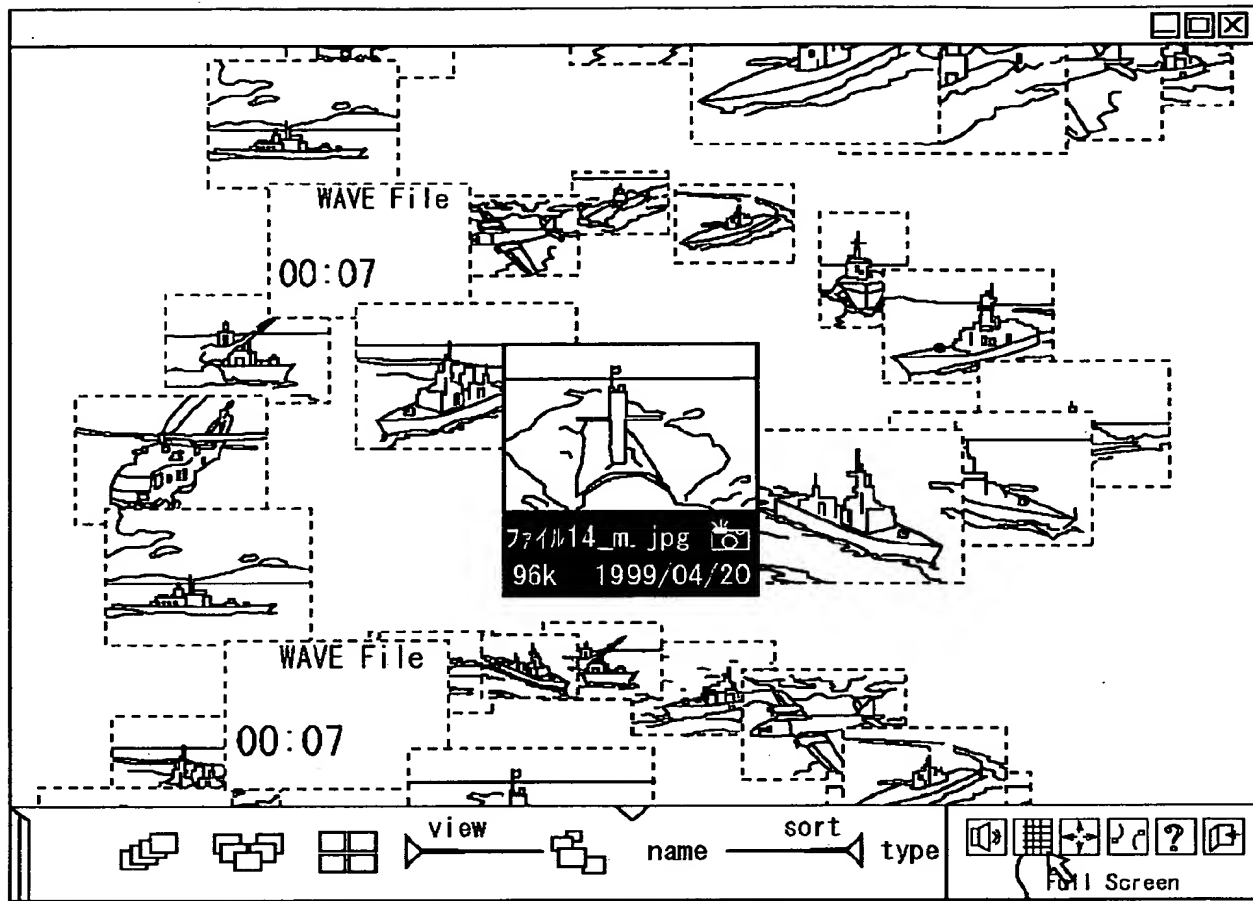
[Drawing 70]



[Drawing 57]

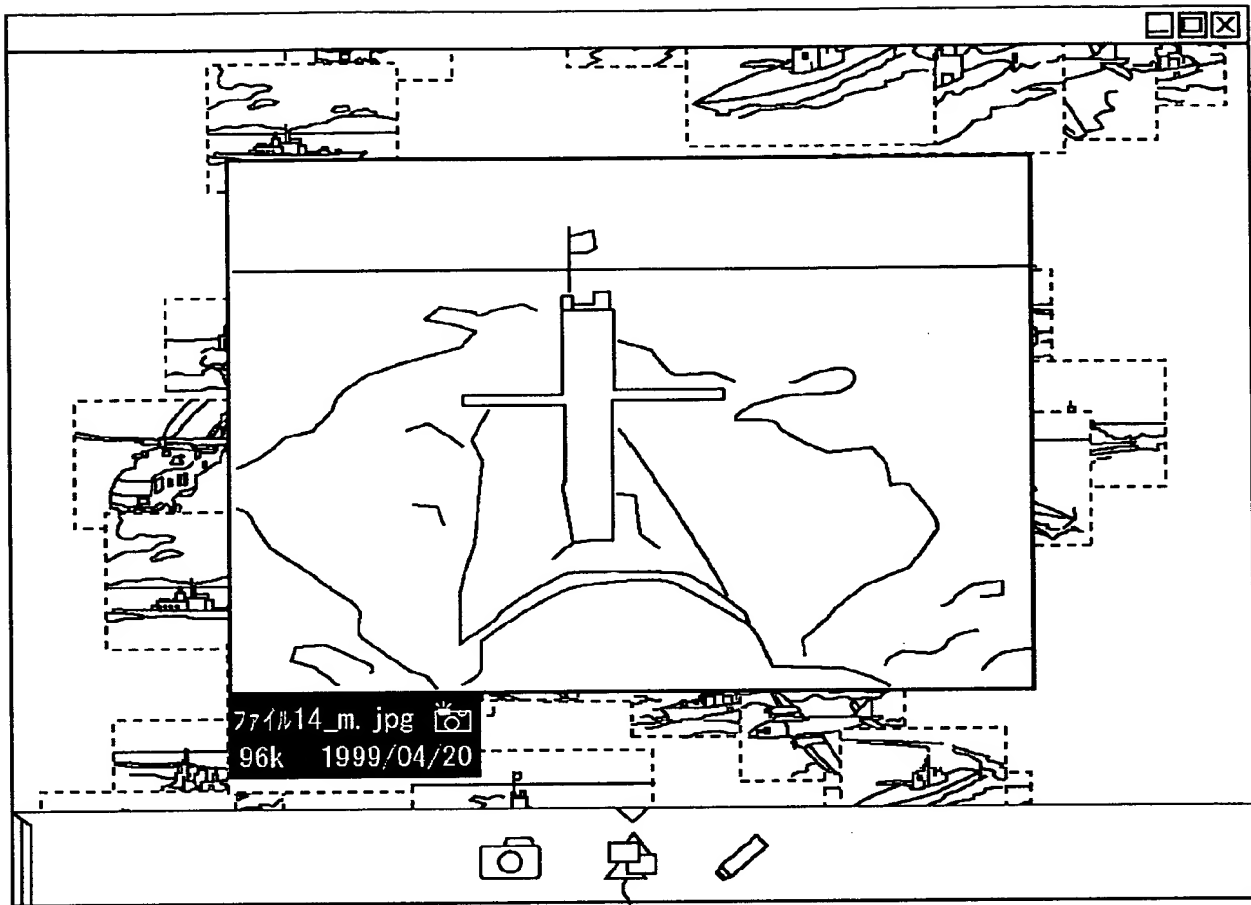


[Drawing 58]



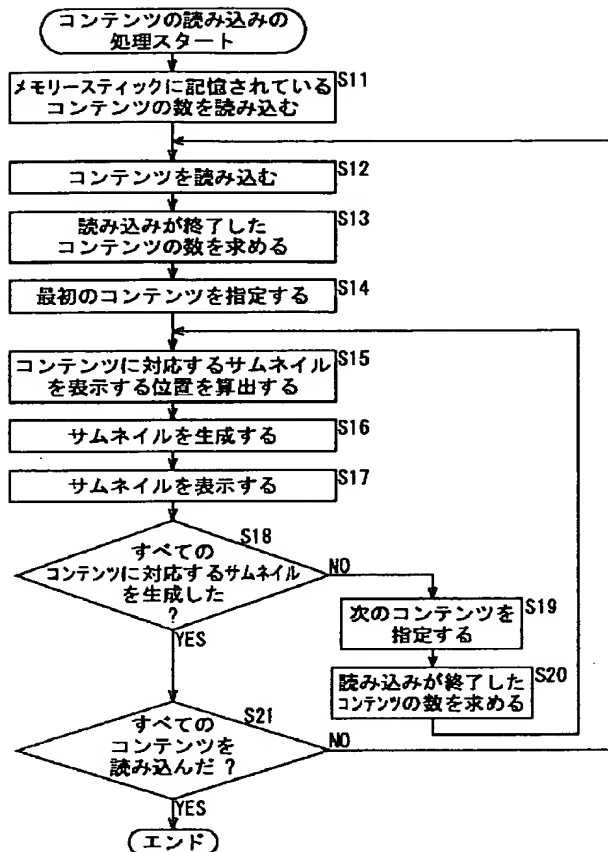
301

[Drawing 59]

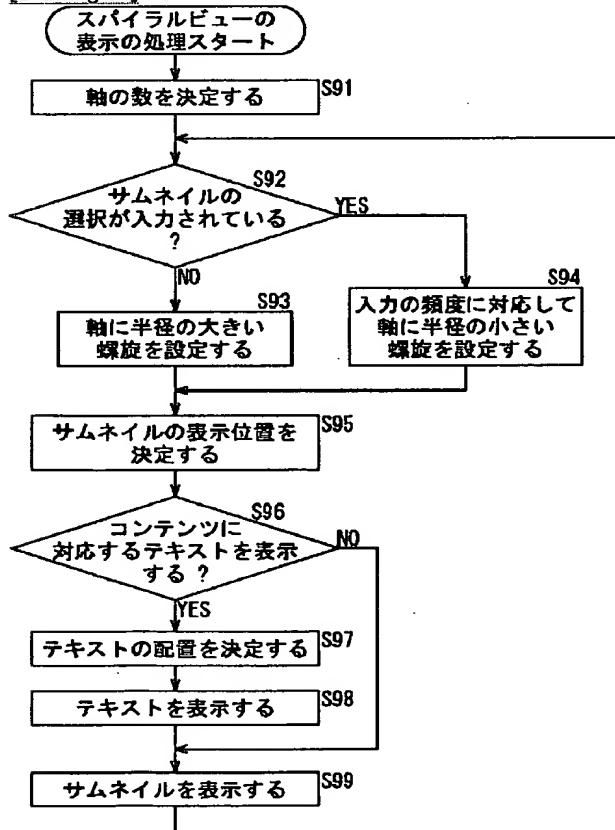


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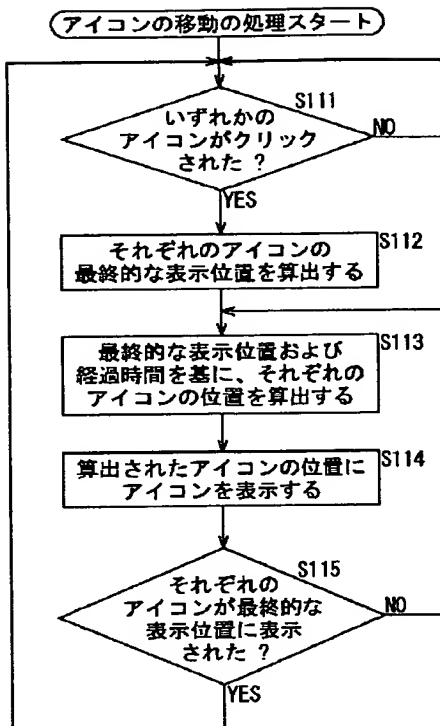
[Drawing 60]



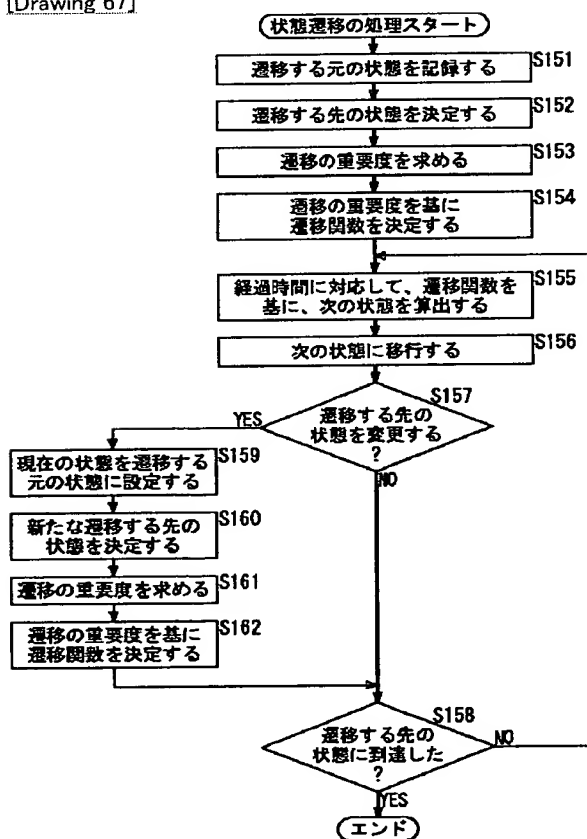
[Drawing 64]



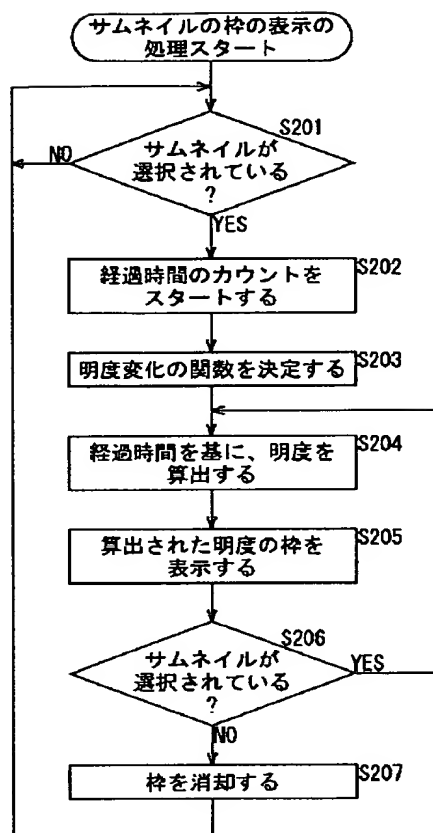
[Drawing 65]



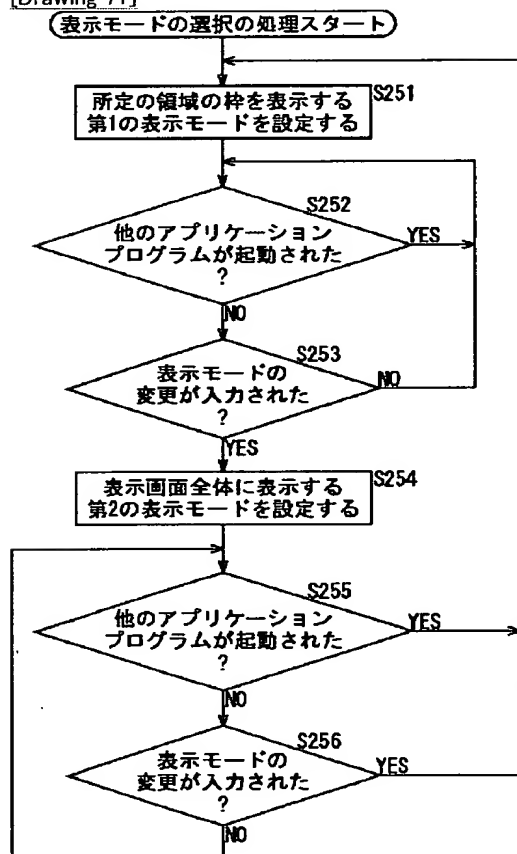
[Drawing 67]



[Drawing 69]



[Drawing 71]



[Translation done.]

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